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A REVISION OF THE FAMILY LIOPTERIDAE (HYMENOPT., CYNIPOIDEA)

By Dr. H. Hedicke (Berlin)
and
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(*Manchester Museum, Victoria University of Manchester : formerly University Assistant in Zoology, Glasgow.*)

With Plates 1–3 and Thirty Text-figures.

Manuscript received 27.iii.1939.

[Read 7th February, 1940.]

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Introduction.

The authors began to study the Lioperidae in September 1933. Kerrich had been unable to name some material in the Stockholm museum; while the senior author had for some time been in correspondence with Mr. L. H. Weld, of East Falls Church, Virginia, U.S.A., and had also discussed these insects with him during his visits to Berlin. It was evident that the Westwood species were in need of re-description, and it was decided that Kerrich should visit Oxford to this end. This visit was made in June 1934, when Professor Hale Carpenter lent the Westwood types, a kindness which has, in fact, made this work possible. From the study of this material, Kerrich came to the conclusion that the characters that had been used to separate *Liopteron* and *Peras* were not sound, and that the genus *Peras* should be placed in synonymy. This opinion was already held independently by Hedicke, and our subsequent work has confirmed it.

In the late summer of 1934, Kerrich made a central European tour, and was able to see further material in the Budapest and Vienna museums. In Berlin the two authors held much further discussion, and it was decided to write a revision of the whole group. The work then continued intermittently, and in September 1936 the authors again met in Berlin and discussed the form of the paper and other outstanding points.

The work has been shared as follows : Hedicke has written the historical

introduction, and has been responsible for research into the literature; Kerrich has written the present introduction and the characters of the family with key to subfamilies. Hedicke has described the material from the German (excluding Austrian) museums; Kerrich that from the others, *i.e.* London, Oxford, Stockholm, Budapest, Vienna and Paris. Kerrich has also re-described *L. nigrum* (Westw.), since it was necessary to compare this species very closely with *L. fuscicorne* Westw. and *L. clavicorne* Westw. While in the two remaining subfamilies about half the work falls to Hedicke, in the LIOPTERINAE most of the material has been at the disposition of Kerrich : the junior author has, therefore, also written the morphological part and the key to genera, and his scheme for the description of species has been used.

The authors wish to express their sincerest thanks to Mr. L. H. Weld for descriptions and figures of material in the United States National Museum, and for valuable criticism. Also to Mr. F. S. J. Hollick for taking photographs of wings, and to all curators who have loaned material.

The coloured pictures of *Liopteron immarginatum* sp. n. were made in the Department of Zoology of the University of Glasgow by Miss Margaret R. Wilson, D.A. (G.S.A.).

HISTORICAL INTRODUCTION.

The genus *Liopteron* was described by Perty in 1833 for the single Brazilian species *L. compressum*. He was doubtful about the systematic position of his genus, and considered it to be related to the Chalcidids and Cynipids. Westwood (1837) described the male of Perty's species from a specimen in the Berlin museum. According to his view, *Liopteron* was to be placed among the Cynipids near the genus *Anacharis*. In the same paper he described a second species, closely related to *Liopteron*, as *Peras nigra*. Not until 1874 did Westwood describe eight more species of *Liopteron*, also from South America. Some of these species are very closely related to " *Peras* " *nigra* Westw.; but on the subject of generic characters he was completely silent. In the following decades but little was added to this : Cameron (1883) described *L. westwoodii* from Panama; and in 1895 Ashmead published the diagnoses of three new Brazilian species. At the same time he united *Liopteron* and *Peras* in the LIOPTERINAE. Of the genus *Peras*, Kieffer (1905) described the new species *P. ruficeps* from Goyas, and (1910*a*) *P. reticulatum*. As is now shown, the latter description was based on the holotype of *P. nigra* Westw.

To the two known genera Kieffer (1911) added three new ones, each with one species : the Mexican *Pseudibalia* and the Brazilian (described in error as African) *Plastibalia* and *Heterocynips*. In the same publication there was also described a third species of *Peras*. Further, he described (1914) the genus *Allocynips* for a new species from the Philippine Islands, to which a second species was added in 1916. Weld (1922) published systematic notes on the LIOPTERINAE, with descriptions of a number of new oriental species. He broadened the basis of the subfamily by the inclusion of *Dallatorrella* Kieff., for which Kieffer had made a new subfamily (1911), and of *Mesocynips* Cameron, 1903, to which Cameron had been unable to assign a definite systematic position. In the same year Hedicke described the genus *Mayrella* with a new species from Formosa, and based on this genus a new subfamily, which we now unite with the LIOPTERIDAE. Weld (1930) found that the genus *Paramblynotus* Cameron, which was placed by that author in the FIGITINAE, was identical with *Allocynips* Kieff., and thus belongs to the LIOPTERIDAE.

Examination of the type has shown that *Paraegilips* Kieffer, 1910 is also a synonym of *Paramblynotus* Cam.

For reasons explained below, we include also the OBERTHÜRELLINAE in the LIOPTERIDAE, which thus includes twelve described genera with thirty-nine species, all from tropical regions.

DIAGNOSIS OF FAMILY AND KEY TO SUBFAMILIES.

LIOPTERIDAE fam. n.

Cynipoidea (Ashmead 1900) with the gaster attached high up on propodeum, which bears a median ventral longitudinal furrow. Segment 4, 5 or 6 of gaster the largest; 3 in the aberrant *Xenocynips*. This family differs from all other Cynipoidea in the position of insertion of the gaster, and from all but the IBALIIDAE in that the largest segment of the gaster is not the second or third.

1. Hind femur with a conspicuous tooth or spine on underside between middle and apex: scutellum prolonged behind into a long spine with a short tooth on either side at base: petiole not or scarcely longer than broad (Weld 1922, fig. 1) . . . . . OBERTHÜRELLINAE Kieff.
   Hind femur and scutellum not so armed . . . . . 2.
2. Petiole not or scarcely longer than broad, attached to remainder of gaster normally at an angle: segment 4, 5 or 6 of gaster the largest **MESOCYNIPINAE** Kch. subfam. n.
   Petiole at least twice as long as medially broad, attached to remainder of gaster tangentially to its dorsal curvature: segment 4 of gaster always the largest in both sexes . . . . . LIOPTERINAE Ashm.

MESOCYNIPINAE subfam. n. contains the genera *Mesocynips* Cam., *Paramblynotus* Cam. (= *Allocynips* Kieff. = *Paraegilips* Kieff.), *Dallatorrella* Kieff., *Mayrella* Hed. and *Paribalia* Weld. It is proposed to deal with these, together with the OBERTHÜRELLINAE, in a later paper.

The LIOPTERINAE as here restricted, which form the subject of the remainder of this paper, are, so far as is known, confined to South and Central America. Kieffer (1911) gives " Egan, Soudan " as the locality for two species, but this is incorrect: Ega is near Teffé in Brazil. The biology of the LIOPTERINAE is entirely unknown.

LIOPTERINAE.[1]

LIOPTERINAE Ashmead, 1894, *Proc. ent. Soc. Wash.* **3**: 17.
LIOPTERINAE Ashmead, 1903, *Psyche* **10**: 59.

GENERIC AND SPECIFIC CHARACTERS, AND TECHNIQUE OF DESCRIPTION.

Head.

The head is more or less strongly transverse. The length to interocular breadth has been measured as follows: head with ocellar prominence (stemmaticum) uppermost, length measured medially, interocular breadth across anterior ocellus. Behind, there is a special medial emargination: this has been described as " emargination behind ocelli " deep, or shallow.

In sculpture, the head is more or less coarsely reticulate [2] in the majority of

[1] I have been asked whether the name should not be " LIOPTERONINAE "; but Professor Sir D'Arcy W. Thompson has kindly informed me that that would be incorrect.

[2] Weld describes this condition as " punctate " even though the punctures are so close together as to be squashed out of shape, giving a reticulate appearance.

species : in the *compressum* group of *Liopteron* and in *Plastibalia* the vertex is strongly longitudinally ridged; the remaining parts are of very various sculpture.

The face (fig. 1) generally bears a median longitudinal keel, and this is usually continuous with the interantennal keel. This latter is sometimes weak, when it is referred to as the " interantennal keel "; more usually it is more or less strongly raised, when the term " interantennal tooth " is used.

The clypeus is sometimes distinctly delimited (*i.e.*, basally and laterally margined); usually it is indistinctly or not delimited. Unless otherwise stated, the sculpture is similar to that of the face; but usually finer, especially apically. A pair of shallow pits is often present at the basal angles : these

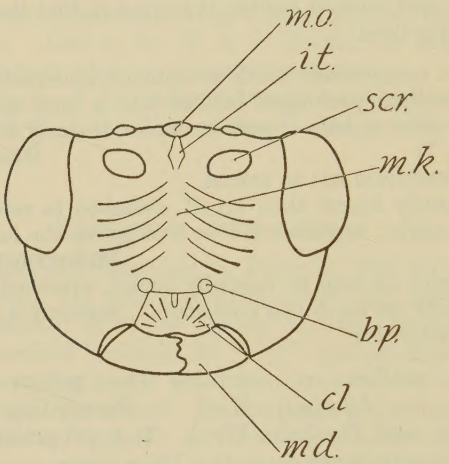

Fig. 1.—Face. *b.p.* = basal pit, *cl.* = clypeus, *i.t.* = interantennal tooth, *md.* = mandible, *m.k.* = median keel, *m.o.* = median ocellus, *scr.* = scrobe.

we have termed " basal pits." There is often a median basal keel or tubercle, which is sometimes almost continuous with the median facial keel. The apex is generally impressed. The apical margin is seldom truncate : usually it is more or less gouged out medially, and this gives it a superficial appearance of being more strongly emarginate than is actually the case.

The malar space is the space between the eye and the base of the mandible. Its length relative to that of the eye has been measured, the lower edge of the gena being taken as the lowest point of the malar space. It must be understood that the greatest length of the eye has been measured; not the length of the eye as it appears in the same plane as the malar space.

Antennae.

The antennae of *Liopteron* are 14-segmented in the male, 13-segmented in the female.

They may be filiform, clavate but not or scarcely compressed, or clavate and more or less strongly compressed. In order to estimate the degree of compression, we have measured segment 12 of the male, 11 of the female, as follows : length to least breadth to greatest breadth. But, owing to the fre-

quent asymmetry of these segments, it is necessary to adopt a convention for the measurement of length. When the antennae are held normally forwards, the longest edge of the scape faces inwards, and the flattening of the flagellum appears dorso-ventral. The segments may then be said to have an upper and a lower surface, and an outer and an inner edge, the tendency to curvature being downwards and outwards. We have decided to measure the length along the inner edge. One of the characters used to separate *Peras* Westw. from *Liopteron* Perty was that the antennae were strongly compressed in *Peras*, not compressed in *Liopteron* : but the different species show such gradation in the amount of compression that we could not in any case consider this a good generic character.

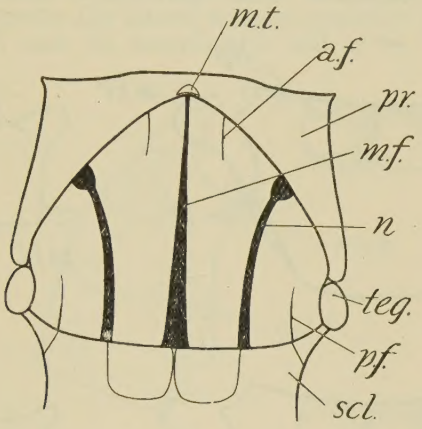

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Fig. 2.—Mesoscutum and adjoining structures. *a.f.* = antero-admedian furrow, *m.f.* = median furrow, *m.t.* = median tooth, *n.* = notaulix, *p.f.* = parapsidal furrow, *pr.* = pronotum, *scl.* = scutellum, *teg.* = tegula.

In the Cynipoidea the antennae are among the most stable structures, but we have not considered it necessary to measure the relative lengths of all the segments; only of 3, 4 and 5, which, we think, will be found to give the best interspecific differences.

Rhinaria are present, usually on the third and following segments of the male, the fifth and following of the female. Those of the female are proportionally larger.

Pronotum.

Anteriorly above, the pronotum is more or less truncate. It is divided into two parts by this truncation; a smaller anterior neck-like part, usually with but little sculpture, and a larger posterior part (fig. 2), which is usually strongly sculptured. We have not found any characters on the anterior part, and have not referred to it in descriptions. The truncation is raised into a strong or rather strong ridge laterally; but dorsally it is usually not so raised, being discernible only as an angulation, separating the more or less smooth anterior part of the pronotum from the strongly sculptured posterior part. The sculpture of the posterior part is generally rather similar to that of the

mesoscutum, at least above. The hind margin of the pronotum is often raised medially, very often into a distinct " median tooth."

Mesoscutum.

The sculpture of the mesoscutum of nearly all the known species of LIOPTERINAE is one of two types : either there is a relatively large number (about twenty-five to thirty) of transverse ridges which are regular, sharp, and close together, and reach the sides of the mesoscutum; or there is a much smaller number (about ten) of transverse ridges which are irregular, usually not so sharp, not so close together, and do not reach the sides of the mesoscutum, which are coarsely reticulate. This character is used for the division of

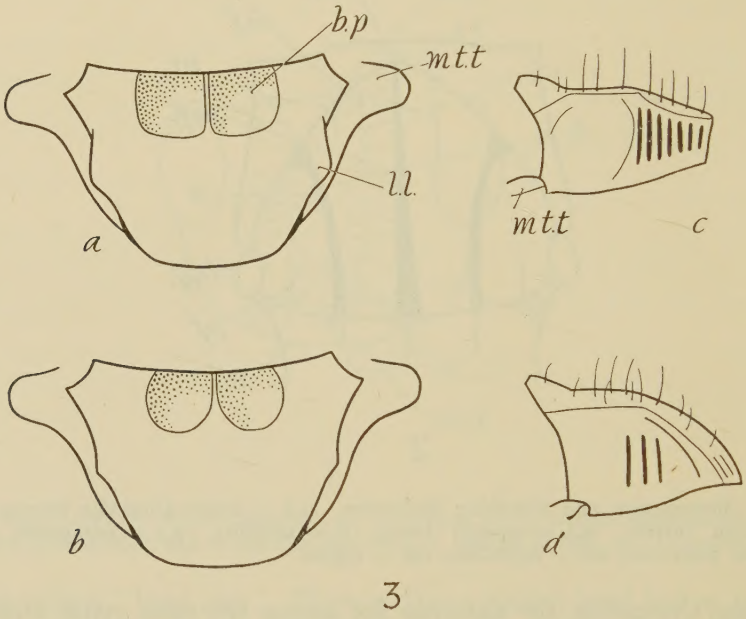

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FIG. 3.—Scutellum. *a*. Dorsal view, exhibiting the condition " laterally strongly lobate." *b*. Dorsal view, exhibiting the conditions " laterally weakly lobate " and " with basal pits separated by a short keel." *c*. Side view, exhibiting the condition " falling suddenly to level of metanotum." *d*. Side view, exhibiting the condition " falling gradually to level of metanotum." *b.p.* = basal pit, *l.l.* = lateral lobe, *mt.t.* = metategula.

Liopteron into species-groups : in the known species of *Plastibalia* the former condition is present, in those of *Pseudibalia* the latter.

No less than seven furrows may be developed (see fig. 2). The notaulices are usually well developed and percurrent. These have commonly been termed " Parapsidenfurchen " by central European authors : Weld (1922) has used the term " parapsidal grooves." A median furrow is often developed, sometimes as strongly as the notaulices; usually it is stronger posteriorly than anteriorly, and, when not percurrent, is obliterated anteriorly. The term " parapsidal furrows " is here used in its correct sense (see Snodgrass, 1935 : 181) for a pair of much weaker lateral furrows, which begin posteriorly, and run forward for less than half the length of the mesoscutum. Lastly, there is

often a pair of antero-admedian furrows whose position is indicated in the figure : these are usually weak, and also run for less than half the length of the mesoscutum.

Scutellum.

The scutellum (mesoscutellum) is a large and prominent structure (fig. 3*a–d*). It has a pair of basal pits separated by a sharp median keel; they are usually quite smooth, and are to be taken as normal unless otherwise described. It is approximately on a level with the mesoscutum, but is raised above the level of the metanotum, which runs around it laterally and posteriorly. It has a pair of lateral lobes : the lateral margins which run as far as these lobes separate the upper surface from the sides of the scutellum which they overhang. In the majority of species the lateral margins continue around the scutellum posteriorly, in which case the scutellum is said to be " falling suddenly to

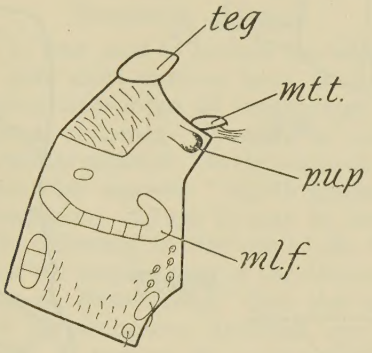

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Fig. 4.—Left mesopleuron, illustrating the condition typical of *Liopteron* group *nigrum*. *ml.f.* = medial furrow, *mt.t.* = metategula, *p.u.p.* = posterior upper pit, *teg.* = tegula.

level of metanotum " (fig. 3*c*) : this hind margin is usually more or less rounded, but in some species is bidentate and emarginate. In a few species, on the other hand, the lateral margins are not continued beyond the lateral lobes : such a condition is described as " falling gradually to level of metanotum " (fig. 3*d*). The sides of the scutellum are always vertically ridged. The tegulae covering the bases of the hind-wings are formed as projections of the mesoscutellum.

The pubescence is generally almost erect.

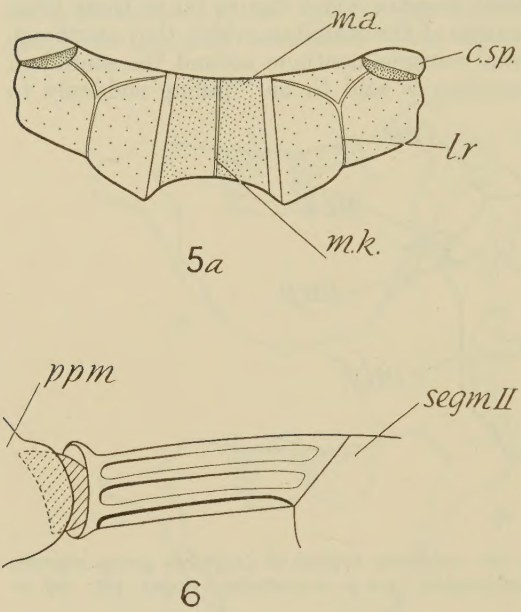
Mesopleura.

The chief features of the mesopleura (fig. 4) are the medial longitudinal furrow, the anterior upper area, and the posterior upper pit. The longitudinal furrow is situated rather below the middle of the pleuron : it is convenient to refer to sculpture above and below it. It may be uninterrupted, traversed by a number of keels, or even broken up into a series of quadrangular punctures. It is often reflected upwards posteriorly, sometimes also anteriorly. The anterior upper area is a very constant feature of the group : it is usually more strongly hairy than the rest of the mesopleuron, frequently very densely hairy. It leads backwards into the deep or rather deep posterior upper pit, which is placed below and usually a little before the metategula.

Apart from these features, the mesopleura are in *Liopteron* spp. of group *L. compressum* nearly smooth and glabrous, but in groups of *L. nigrum* and *L. bifasciatum* the sculpture is generally more complex: typically the mesopleura are, below the furrow, coarsely punctate posteriorly and finely punctate medially, and anteriorly they bear a large oval pit.

Metathorax.

The metanotum is narrow, narrowest medially, where it is often overhung by the mesoscutellum. The metapleura are strongly sculptured.



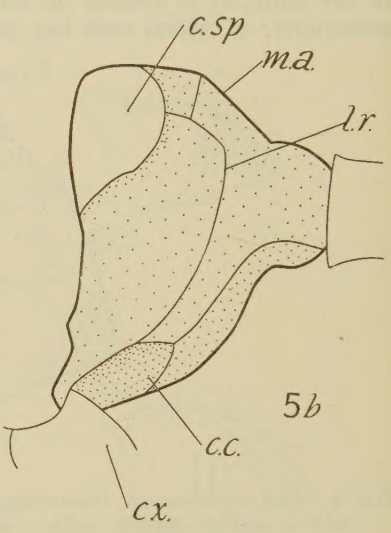


Fig. 5.—Propodeum in *a* dorsal and *b* lateral view. *c.c.* = coxal cavity, *c.sp.* = calyptra of spiracle, *cx.* = coxa, *l.r.* = lateral ridge, *m.a.* = median area, *m.k.* = median longitudinal keel. *Cf.* fig. 8.

Fig. 6.—Petiole in lateral view, illustrating especially the "ball and socket joint" by which this segment articulates with the propodeum (*ppm.*).

Propodeum.

The propodeum (fig. 5*a*–*b*) is strongly sculptured. It bears a median ventral longitudinal furrow. Dorsally is a median area, bounded laterally by a pair of strong, smooth, and usually broad keels, and divided by a much weaker median keel. This latter is described as strong or weak in relation to its condition in other species, not in relation to the strength of the lateral keels. There is a pair of lateral ridges, which may or may not be produced into distinct lobes. The spiracular openings are covered by a calyptra, which only opens behind.

Petiole.

The first segment of the gaster (true second abdominal segment) is roughly cylindrical in shape, and is known as the petiole (fig. 6). It bears a number of

longitudinal keels, and a number of longitudinal furrows. There is either a median furrow or a median keel; a median keel, however, seldom attains the posterior end of the petiole. Typically the keels and furrows alternate; but there is often a dorsal flattening of the petiole that so obscures the furrows to either side of the median keel or flattens and broadens the keels to either side of the median furrow that they can scarcely be described as such.

The petiole is one of the less stable structures in these insects : the furrows can vary considerably in strength, the keels can become confluent, and the median keel can by aberration be divided.

The petiole articulates with the propodeum by a ball-and-socket joint (see fig. 6). Its length is measured mid-dorsally, beginning from the anterior rim of the cylinder : the " ball " is left out of account, as the amount of it showing in dorsal view depends on the amount the gaster is raised or lowered.

Remainder of gaster.

The term " gaster " is here used to include the whole abdomen except the propodeum. For this part most authors have used the term " abdomen," either through insufficient knowledge of morphology, or because the part concerned is the functional abdomen. It seems to me unfortunate to apply the term " seventh abdominal segment " to the segment that is morphologically the eighth. But to term that segment " eighth abdominal segment " would now cause too much confusion; though it may be termed " true eighth abdominal segment." The objection to this use of the term " gaster " is that it has been used to mean the swollen part of the abdomen beyond the petiole, especially by authorities on FORMICIDAE. But that is not a morphological entity throughout the Hymenoptera Apocrita, or even throughout the Cynipoidea; and I prefer, at present, to employ the term " gaster " in the strict morphological sense in which it has often been used or understood, rather than to coin a new term.

In the subfamily LIOPTERINAE as here restricted the fourth segment of the gaster is always the largest in exposed area, but not necessarily the longest as measured along the dorsal curvature. The relative dorsal lengths of tergites 4, 5, 6 and 7 are given. The gaster may be dorsally keeled; but this refers to a mid-dorsal angulation of the tergite, not to a raised keel. Probably it is always dorsally keeled in the female, seldom in the male; but some species are keeled from segment 3 hindwards, others only from segment 5, in which latter case the keel is less pronounced. The spiracle of the seventh tergite (true eighth abdominal segment) is visible. The eighth segment of the gaster (true ninth abdominal) is hidden in the male : but in the female there project the tergum, and also the ovipositor sheaths (third valvulae of Snodgrass, 1935 : 611, 617–9).

For measuring the length of the remainder of gaster relative to that of the petiole the gaster has been taken in side view : the length is then taken as the distance from the middle point of the suture separating the petiole from the second segment, as seen in this view, to the apex of the third valvulae.

Wings.

The usual nomenclature for the wing veins has been followed (fig. 7). The gross colour pattern—*e.g.*, whether the wing is fasciated or not—we believe to be important; but the amount and extent of infuscation are probably very variable. An infuscation which appears to broaden the basalis and subcostalis,

which may include the cubital cell, and which broadens out beneath, is not, in this work, held to constitute a distinct fascia. Apart from this, the most important character is provided by the proportions of the radial cell. These are taken from *inside measurements*. Possibly it would be more correct to measure always from the middle of the thickness of a wing vein, but experience shows that such procedure does not lead to such accurate results.

Legs.

Few characters have been noted in the form of the legs. The legs are relatively short and thick in *Liopteron* group *bifasciatum*, but intermediate conditions occur.

The presence or absence and strength of an apical external tooth on the

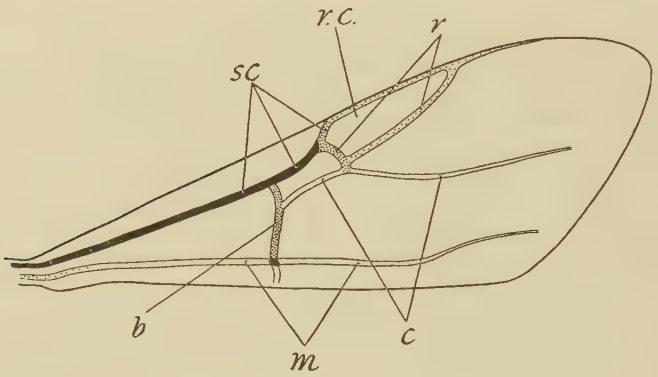


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Fig. 7.—Fore-wing. *b.* = basalis, *c.* = cubitalis, *m.* = mediana, *r.* = radialis, *r.c.* = radial cell, *sc.* = subcostalis.

hind tibia has been noted. The inner surface of the hind tibia is strongly and irregularly punctate and strongly hairy, and bears a strong medial longitudinal ridge: but this form has not yet been found to provide specific characters. The hind metatarsus is rather similarly constructed.

The fore legs bear the usual apparatus for cleaning the antennae.

Figures.

Hedicke's figures of gasters (figs. 10, 25 and 28) have been drawn free-hand, those of wings (figs. 26 and 27) were made with a " Promi " apparatus. The figures of Kerrich used to illustrate this section (figs. 1–7) were drawn free-hand: the remainder were made by mounting the insect on a stand under the binocular microscope, and using a squared eye-piece and graph paper. The figures of the gaster of *L. abdominale* Westw. and *L. levilaterale* sp. n. were made some time before the others, using a different microscope, and the same degree of accuracy was not obtained. In some figures of heads a considerable degree of asymmetry appears. This is accounted for by the fact that the insect was set up in the stand in such a way that the horizontal axis of the head was parallel to the work-bench; so that, with the right eye, it was possible to see more of the right than of the left side of the head. Had the

insect been mounted with the horizontal axis of the head at right angles to the line of vision of the right eye, this asymmetry would, presumably, have been avoided.

Measurements.

Mr. Weld and I have had considerable discussion about our methods of quoting relation proportions. He wrote—" Here again I prefer to record the

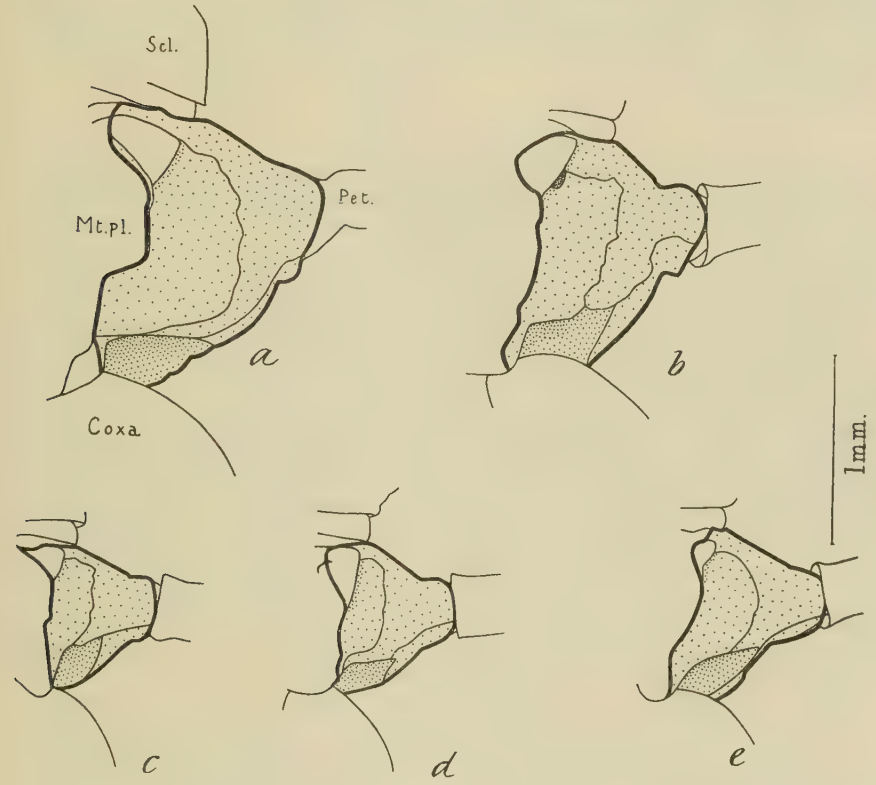

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Fig. 8.—Propodeum in lateral view of *a. L. abdominale* Westw. holotype ♀, *b. L. fuscicorne* Westw. holotype ♀, *c. L. bifasciatum* Westw. holotype ♂, *d. L. rufipes* (Kieff.) holotype ♀, *e. L. antennale* sp. n. holotype ♀. *Mt. pl.* = metapleuron, *pet.* = petiole, *scl.* = scutellum. *Cf.* fig. 5.

raw data. If the reader wants the ratios he can figure them out and has a basis for evaluating their validity." I agree entirely that my procedure in reducing ratios to unity is open to the implied objection; but I adopt this method in order to provide a direct comparison both between different species and between different specimens of the same species.

Discussion of and Key to Genera.

The genus *Peras* was founded by Westwood (1837) for his species *niger*; but in 1874 he described the very closely related species *fuscicorne*, *clavicorne*, and *subpetiolatum* among *abdominale* and others in the genus *Liopteron*. The following characters have been used to separate the two genera :

Liopteron.	*Peras*.
Antennae more or less filiform.	Antennae clavate and compressed.
Scutellum behind with two teeth.	Scutellum rounded behind.
Petiole without median keel.	Petiole with median keel.
Discoidal nervure interstitial with the median nervure.	Discoidal nervure not interstitial with the median nervure (Ashmead 1903).
♀ antennae 13-jointed, ♂ 14-jointed.	♀ unknown, ♂ antennae 13-jointed (Ashmead 1903 *err.*).

Now the antennae of different species could be placed in a graded series from filiform to strongly clavate and compressed; and a study of the species shows that the characters listed (leaving Ashmead's error out of consideration) are more or less strongly developed in different species, and occur in almost any combination. These characters, therefore, are not of generic value; and the genus *Peras* Westw. falls as a synonym of *Liopteron* Perty.

The genus *Heterocynips* was founded by Kieffer (1911) for his new species *rufipes*. He gave no separate generic description but, in his incomplete key to genera, separated *Heterocynips* from *Peras* as follows—"Antennes non déprimées, scutellum bidenté." This may be interpreted as including the following other species of *Liopteron : bifasciatum* Westw., *unifasciatum* Westw., *rufum* Ashm., *tarsale* Ashm., *westwoodii* Cam., *brevicorne* sp. n., *weldi* sp. n. and *confusum* sp. n. Weld (1922) separates *Heterocynips* from *Liopteron* as follows : "Propodeum conical with abdomen attached at apex; that is, the dorsal and ventral lengths equal. Africa." Now the ventral length is, in any case, a difficult thing to measure. The type has been figured (fig. 8*d*), and I have decided to treat it as a species of *Liopteron*. But, if the genus *Heterocynips* really is distinct upon the form of the propodeum, then either the whole *bifasciatum* species-group must go into it, or at least all the above-named species.

Key to genera.

1. Metatarsus or second segment of hind tarsus with a prolongation on outer side as in *Ibalia* . . . . . 2.
   Metatarsus and second segment of hind tarsus without such a prolongation (fig. 9*c*) . . . . . *Liopteron* Perty.
2. Prolongation is on second segment of hind tarsus (fig. 9*a*) *Plastibalia* Kieffer.
   Prolongation is on hind metatarsus (fig. 9*b*) . . . *Pseudibalia* Kieffer.

Liopteron Perty.

Liopteron Perty, 1833, *Delect. Anim. artic. Ins. Brasil.* : 140.
Leiopteron Westwood, 1837, *Mag. Zool.* **7** (Ins. explic. tab. 179) : 1.
Peras Westwood, 1837, *ibid.* **7** : 2.
Liopterum Agassiz, 1846, *Nomencl. zool.* (*Index*) : 212.
Perus Scudder, 1882, *Nomencl. zool.* (suppl. List) : 255.
Perus Dalla Torre, 1893, *Cat. Hym.* **2** : 11.
Liopteron Dalla Torre, 1893, *ibid.* **2** : 12.
Liopteron Dalla Torre & Kieffer, 1910, *Das Tierreich* **24** : 29.
Peras Dalla Torre & Kieffer, 1910, *ibid.* **24** : 33.

Heterocynips Dalla Torre, 1910, *Ent. Jahrb.* **20** : 179 (*nomen nudum*).
Heterocynips Kieffer, 1911, *Boll. Soc. ent. Ital.* **41** : 247.
Peras Kieffer, 1911, *ibid.* **41** : 247.
Heterocynips Rohwer & Fagan, 1917, *Proc. U.S. nat. Mus.* **53** : 368.
Liopteron Rohwer & Fagan, 1917, *ibid.* **53** : 370.
Peras Rohwer & Fagan, 1917, *ibid.* **53** : 373.
Peras Weld, 1922, *Philipp. J. Sci.* **21** (3) : 325.
Heterocynips Weld, 1922, *ibid.* **21** (3) : 325.
Liopteron Weld, 1922, *ibid.* **21** (3) : 325.

Liopterinae without prolongation on first or second segment of hind tarsus. Antennae filiform, clavate, or clavate and compressed. Mesoscutum regularly transversely ridged or coarsely reticulate, only in the aberrant *L. levilaterale* sp. n. partly smooth. Scutellum more or less rounded, or weakly to rather strongly bidentate and emarginate behind; but not with a pair of large, strongly inwardly curved teeth as in *Plastibalia* (fig. 30).

Key to species-groups.

1. Mesoscutum regularly transversely ridged throughout; the ridges are very sharp and close together, and reach the sides of the mesoscutum: in the aberrant *levilaterale* sp. n. the ridges are not sharp or so close together, and the sides of the mesoscutum are smooth. Antennae more or less filiform. Large or rather large and slender insects, seldom less than 10 mm. in length . . . group *compressum* (or subgenus *Liopteron*).
   Mesoscutum coarsely reticulate; the transverse ridges are irregular, not close together, and do not extend to the lateral margins of the mesoscutum: the sides of the mesoscutum are, however, never smooth. Antennae usually clavate and strongly compressed. Mostly smaller insects . . . . . 2.
2. Wings basally more or less dark, apically hyaline: hind femora not strongly or moderately strongly thickened. Ventral length of propodeum much greater than dorsal length (fig. 8*b*). . . group *nigrum* (or subgenus *Peras*).
   Wings distinctly fasciated; hind femora strongly or moderately strongly thickened. Ventral length of propodeum not much greater than dorsal length, an intermediate condition exhibited by *brasiliense* sp. n., *antennale* sp. n., and presumably by *ruficeps* Kieff. (fig. 8*c*, *d*, *e*)
   group *bifasciatum* (or subgenus *Heterocynips*).

Key to species.

1. Pronotum, except dorsally, smooth and shining, its punctures very small and sparse . . . . . 2.
   Pronotum not smooth and shining, or only so narrowly below . . . . 3.
2. Sides of mesoscutum not smooth: seventh tergite of gaster unarmed *bicolor* Hed. sp. n., p. 198.
   Sides of mesoscutum smooth: seventh tergite of gaster armed with a sharp tooth . . . . . *levilaterale* Kch. sp. n., p. 199.
3. Mesoscutum regularly transversely ridged throughout; the ridges are sharp and close together . . . . . 4.
   Mesoscutum coarsely reticulate; if transversely ridged the ridges are irregular, not close together, usually not so sharp, and do not extend to the lateral margins of the mesoscutum . . . . . 8.
4. Seventh tergite of gaster armed with a single large tooth . . . . . 5.
   Seventh tergite of gaster not so armed . . . . . 6.
5. Larger form (♀ 12–13 mm.): mesoscutum with parapsidal furrows small but distinct . . . . . *compressum* Perty, p. 193.
   Smaller form (♀ 9–10 mm.): mesoscutum with parapsidal furrows very indistinct . . . . *compressum* Perty var. *minus* Kch. var. n., p. 194.

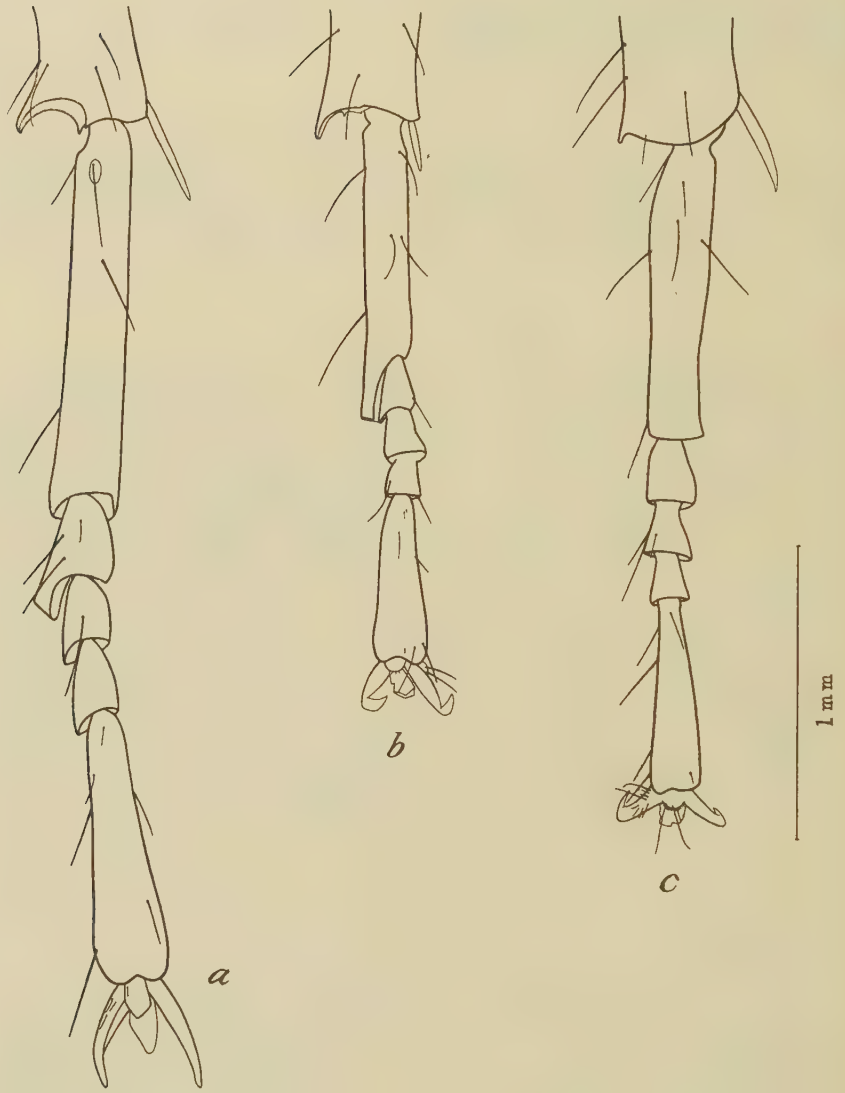

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Fig. 9.—Left hind tarsus with apex of tibia of *a. Pl. nigripennis* (Westw.) holotype ♂, *b. Ps. fasciatipennis* Kieff. ♀, and *c. L. fuscicorne* Westw. ♀. A few representative hairs only have been put in, and these have been drawn accurately.

6. Seventh tergite of gaster armed with two strong spines *bispinosum* Kch. sp. n., p. 194.
   Seventh tergite of gaster not so armed . . . . . 7.
7. Cheeks margined to only just below level of eyes: female gaster not greatly elongate (fig. 13) . . . . . *immarginatum* Kch. sp. n., p. 195.
   Cheeks normally margined: female gaster greatly elongate (fig. 14) *abdominale* Westw., p. 196.
8. Wings basally more or less dark, apically hyaline: hind femora not strongly or moderately strongly thickened: ventral length of propodeum much greater than the dorsal length (fig. 8*b*) (group *nigrum*) . . . 9.
   Wings distinctly fasciated: hind femora strongly or moderately strongly thickened: ventral length of propodeum in the majority of species not much greater than the dorsal length (fig. 8*c–e*) (group *bifasciatum*) 18.
9. Petiole with median keel weak or absent: ♀ gaster falling rather suddenly behind . . . . . 10.
   Petiole with strong median keel: ♀ gaster falling rather gradually behind 13.
10. Antennae not strongly compressed: petiole with strong median furrow . 11.
    Antennae strongly compressed: petiole without median furrow . . . 12.
11. Antennal grooves finely striato-punctate and densely piliferous anteriorly: clypeus irregularly striato-punctate, with distinct smooth apical margin: wings in greater part luteous to infuscate, with infumate apical margin . . . . . *intermedium* Kch. sp. n., p. 200.
    Antennal grooves anteriorly finely aciculate: clypeus laterally coarsely reticulate, without distinct smooth apical margin: wings in basal half infuscate, in apical half hyaline *intermedium* var. *autazense* Kch. var. n., p. 201.
12. Petiole (♀) one-third length of remainder of gaster, 2·45 times as long as medially broad; with median keel minute: clypeus rather coarsely striato-punctate, centrally not at all shining: length 10 mm. *birói* Kch. sp. n., p. 201.
    Petiole (♀) about one-fifth length of remainder of gaster, twice as long as medially broad; with median keel weak but not minute: clypeus centrally very finely punctate, somewhat shining: length 7 mm. *subpetiolatum* Westw., p. 202.
13. Petiole with dorsal transverse ridges: males alone known . . . . . 14.
    Petiole without dorsal transverse ridges: females alone known . . . 16.
14. Head not very broad, length to interocular breadth about 1 : 1·3: fore-wings with a clouded area at apex of radial cell . . . . . 15.
    Head very broad, length to interocular breadth = 1 : 1·6 (fig. 18): fore-wings without such a clouded area . . . . *laticeps* Kch. sp. n., p. 203.
15. Petiole 2·3 times as long as medially broad . *scaberrimum* (Kieff.), p. 204.
    Petiole 3·3 times as long as medially broad . . *fenestratum* Ashm., p. 205.
16. Wings in basal half rather strongly infuscate: scutellum laterally weakly lobate: gaster with pubescence on tergite 4 rather inconspicuous *nigrum* (Westw.), p. 206.
    Wings in basal half weakly infuscate: scutellum laterally strongly lobate: gaster with pubescence on tergite 4 very distinct (fig. 16) . . . . 17.
17. Length 8–9 mm.: emargination behind ocelli shallow (fig. 19): antennae (♀) strongly compressed, ratio of axes of segment 11 = 1 : 1·65: female gaster as in fig. 16 . . . . . *fuscicorne* Westw., p. 207.
    Length 6·5 mm.: emargination behind ocelli moderately shallow (fig. 20): antennae (♀) very strongly compressed, ratio of axes of segment 11 = 1 : 1·83: female gaster falling more gradually behind *clavicorne* Westw., p. 208.
18. Petiole with dorsal transverse ridges . . . . . 14.
    Petiole without dorsal transverse ridges . . . . . 19.

19. Scutellum apically more or less strongly bidentate: petiole relatively long, with median keel minute or absent: antennae not very strongly compressed, ratio of axes of segment 11 of female and 12 of male less than 1 : 1·5 . . . . . 20.
    Scutellum rounded behind: petiole relatively shorter, with strong median keel (may by aberration be divided into two): antennae very strongly compressed, ratio of axes greater than 1 : 1·5 . . . . . 28.
20. Tergite 4 of gaster not or not strongly hairy . . . . . 21.
    Tergite 4 of gaster very strongly hairy, bearing almost as much hair as does tergite 5 (fig. 25) . . . . . *confusum* Hed. sp. n., p. 216.
21. Fore-wings bifasciate . . . . . 22.
    Fore-wings unifasciate . . . . . 27.
22. Hind margin of pronotum may be raised medially, but is without a distinct median tooth . . . . . 23.
    Hind margin of pronotum with a distinct median tooth . . . . . 26.
23. Face with a pair of large, shallow pits: clypeus coarsely reticulate like the face, without median basal keel: male alone known *bifasciatum* Westw., p. 208.
    Face without such a pair of pits: clypeus with ridges or striae directed toward the mouth, and with median basal keel: females alone known 24.
24. Clypeus with median apical smooth furrow: gaster not falling suddenly behind: hind-wings bifasciate . . . . . *weldi* Kch. sp. n., p. 209.
    Clypeus without median apical smooth furrow (though sometimes smooth apically): gaster falling suddenly behind: hind-wings not bifasciate . 25.
25. Antennae (♀) much longer than head, thorax, and propodeum; segment 4 without rhinaria: anterior margins of cavities of mid coxae produced into small teeth internally . . . . . *rufipes* (Kieff.), p. 210.
    Antennae (♀) scarcely longer than head, thorax, and propodeum; segment 4 with rhinaria: anterior margins of cavities of mid coxae not toothed internally . . . . . *brevicorne* Kch. sp. n., p. 211.
26. Black. Scutellum with basal pits longer than broad, the two forming two-fifths width of base of scutellum, a pit being narrower than the adjacent lateral space; distinctly apically bidentate, the teeth overhanging metanotum: petiole 3·5 times as long as broad, one-half length of remainder of gaster: hind tibia without prominent apical external tooth: hind-wing uniformly infuscated: malar space = 0·6 eye length: antennae not compressed . . . . . *tarsale* Ashm., p. 212.
    Rufous. Scutellum with basal pits broader than long, the two forming about four-fifths width of base of scutellum, a pit being wider than the adjacent space; obscurely bidentate behind, the apex not overhanging metanotum: petiole 3·1 times as long as broad, one-third length of remainder of gaster: hind tibia with a prominent, thin, blunt external lobe at apex: hind-wing hyaline basally: malar space = 0·7 eye length: antennae slightly compressed . . . . . *rufum* Ashm., p. 213.
27. Antennae (♂) moderately strongly compressed: clypeus apically very strongly transversely impressed as in the Ichneumonid genus *Pimpla*; not with ridges directed toward the mouth: pronotum with strong median tooth: notaulices abnormally broad and shallow *unifasciatum* Westw., p. 214.
    Antennae (♀) not compressed: clypeus not thus impressed; with ridges directed toward the mouth: pronotum without median tooth: notaulices not abnormally broad and shallow . . . . . *westwoodii* Cam., p. 215.
28. Fore-wing weakly and incompletely unifasciate cf. *subpetiolatum* Westw., p. 202.
    Fore-wing strongly bifasciate . . . . . 29.
29. Described male . . . . . *ruficeps* (Kieff.), p. 217.
    Hitherto unknown females . . . . . 30.

30. Female gaster falling rather suddenly behind; tergite 6 at an obtuse angle to tergite 4; dorsally keeled from segment 3 hindwards (fig. 28): clypeus in apical third not transversely impressed: segment 5 of female antenna longer than segment 3 . . . . . *brasiliense* Hed. sp. n., p. 217.

Female gaster falling very suddenly behind; tergite 6 at an acute angle to tergite 4; dorsally keeled from segment 5 hindwards (fig. 29): clypeus in apical third strongly transversely impressed: segment 5 of female antenna shorter than segment 3 . . . *antennale* Kch. sp. n., p. 218.

Species-group *compressum*.

Liopteron compressum Perty (*Typus generis*).

Liopteron compressum Perty, 1833, *Delect. Anim. artic. Ins. Brasil.*: 140, tab. 27, f. 15.
Leiopteron compressum Westwood, 1837, *Mag. Zool.* **7** (Ins. explic. tab. 179): 1.
Liopteron compressum Dalla Torre & Kieffer, 1910, *Das Tierreich* **24**: 31.

Female :—head coarsely reticulate, length to interocular breadth = 1 : 1·25: emargination behind ocelli rather shallow. Antennal grooves indistinct: vertex longitudinally ridged. Face coarsely striato-punctate or striato-reticulate, with strong median keel: interantennal keel small. Clypeus indistinctly delimited laterally; with fine striae directed towards the mouth; with basal pits distinct; apically impressed and narrowly emarginate. Cheeks coarsely reticulate, strongly and acutely margined. Malar space nearly equal to eye length. *Antennae* filiform, slightly incrassate apically, segments 3, 4 and 5 as 1 : 1·33 : 1·33. *Pronotum* strongly transversely ridged dorsally and dorso-laterally, laterally and below shining, weakly and sparsely punctate; with median tooth distinct, very blunt. *Mesoscutum* regularly and closely transversely ridged: notaulices percurrent; antero-admedian furrows weak; parapsidal furrows moderately strong; median furrow absent. Scutellum coarsely reticulate above, with basal pits each divided by a longitudinal keel; irregularly rounded or almost truncate behind; with strong lateral lobes; falling rather suddenly to level of metanotum. Mesopleura in greater part smooth and shining; with narrow medial furrow; strongly reflexed posteriorly; weakly and irregularly interrupted; below furrow sparsely piliferous-punctate: anterior upper area rather densely but not strongly hairy. *Metapleura* coarsely reticulate, almost smooth anteriorly. *Propodeum* with lateral ridges produced into strong sharp lobes: median area longer than broad; median longitudinal keel weak. *Petiole* nearly as long as remainder of gaster, six times as long as medially broad; with a broad median furrow and altogether eight longitudinal keels below; laterally sparsely hairy. Gaster dorsally keeled from segment 5 hindwards; tergites 4, 5, 6 and 7 as 4 : 3 : 2 : 1; tergites 5–7 sparsely piliferous-punctate; tergite 7 armed with a large tooth. *Fore-wings* moderately infumate; sometimes beyond middle with a nearly hyaline, indistinctly delimited fascia, which includes the radial cell; cubital and base of radial cell more strongly darkened. Hind-wings infumate, with subcostal cell nearly hyaline. Radial cell of fore-wing a little more than four times as long as broad: radialis II indistinct at apex. *Legs* slender, hind tibia without apical external tooth.

Black, with pale pubescence.

Length 12 mm.; antenna 6·2 mm.; fore-wing 9 mm.

Male :—antennae filiform, not incrassate apically, about three-quarters length of body. Gaster (fig. 10) with tergites 4, 5, 6 and 7 as 15 : 12 : 10 : 7; tooth of tergite 7 sharp. Petiole 1·3 times as long as remainder of gaster. Wings strongly infumate, without hyaline space. Other characters as in female.

Length 12 mm.; antenna about 9 mm. (last three segments wanting in allotype); fore-wing 9·5 mm.

Holotype Brazil: State of Piauhy.

Holotype ♀ in Zool. Staatssammlung, München; paratype ♀ and allotype

♂ in Zool. Mus., Berlin; another ♂ in Zool. Staatssammlung, München; 1 ♀ in Mus. Wien, 2 ♀♀ in Mus. Oxford.

Liopteron compressum var. **minus** Kch. var. n.

Differs from the typical form as follows: smaller, length 9–10 mm. Striation on face relatively coarser. Mesoscutum with parapsidal furrows very weak. Fore-wings in basal half infuscate, in apical half hyaline, apically infumate (pl. 2, fig. 2).

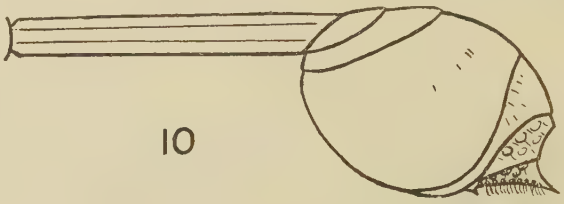


Fig. 10.—Gaster of *L. compressum* Westw. allotype ♂.

Brazil: Amazons, Autaz, x. (*A. Roman*): Peru: Pachitea.

Holotype ♀ in Mus. Stockholm; paratype ♀ in Mus. Budapest.

This variety appears at first sight very distinct from the typical form; and I am surprised at my inability to find good specific characters for their separation.

Liopteron bispinosum Kch. sp. n.

Head (fig. 11) very strongly transverse, length to interocular breadth = 1 : 1·5 : emargination behind ocelli very shallow. Antennal grooves shining but incomplete: vertex strongly longitudinally ridged. Face with very blunt median keel: interantennal

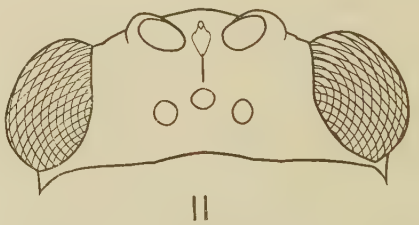


Fig. 11.—Head of *L. bispinosum* sp. n. holotype ♀.

tooth strong and sharp, situated well above centres of antennal bases, its keel produced almost to median ocellus. Face and cheeks coarsely punctate, and with fine aciculations directed towards middle of face. Clypeus scarcely delimited; with apical triangular part smooth, sculptured basally and laterally like the face; with small, deep basal pits; apically sub-truncate and very weakly impressed: labrum strongly projecting. Mandibles basally longitudinally furrowed. Malar space 0·94 eye length. *Antennae* (♀) slightly incrassate to apex; segments 3, 4 and 5 as 1 (width 0·34) : 1·22 : 1·08; segment 4, like the following, with rhinaria, but with fewer above. *Pronotum* coarsely reticulate, dorsally irregularly ridged; broadly raised medially. *Mesoscutum* regularly transversely ridged, about every third ridge much more outstanding: notaulices and median furrow strong, broad, and percurrent; median furrow slightly broader posteriorly; notaulices broadened out into wide pits anteriorly; antero-admedian and parapsidal furrows distinct. Scutellum with broad, deep basal pits each divided by a rather strong longitudinal keel; coarsely reticulate above;

laterally very strongly lobate, the lobes bearing irregular fine punctures; broadly rounded behind and not margined; falling rather suddenly to level of metanotum. Mesopleura shining and almost impunctate; with medial longitudinal furrow narrow, almost uninterrupted: anterior upper area very sparsely hairy. *Metapleura* anteriorly bulging and shining, with a few scattered punctures; posteriorly coarsely and irregularly reticulate, with a strong ridge above. *Propodeum* irregularly longitudinally ridged; lateral ridges strong and broad, but not lobate: median area about as long as apically broad, its lateral keels diverging strongly: median longitudinal keel weak. *Petiole* (♀) about three-eighths length of remainder of gaster, three and a half times as long as medially broad; with three dorsal furrows, four dorsal and four lateral keels. Gaster (♀) with segments 3–5 dorsally keeled, 5 rather indistinctly so; tergite 2 medially very distinctly impressed; tergites 4, 5, 6 and 7 as 72 : 19 : 14 : 16; tergites 5–7 bearing a few piliferous punctures; gaster also bears innumerable minute punctures. Tergite 6 produced into a pair of tubercles; tergite 7 produced into a pair of strong spines. *Wings* very strongly and almost uniformly infumate. Radial cell about five times as long as broad: cubitalis arising on upper fifth of basalis. *Hind tibia* with strong apical external tooth.

Black; mandibles medially rufous; gaster beneath piceous to castaneous.

Length 12 mm.

French Guiana: Pariacabo, vii.1907 (*E. Le Moult*).
Holotype ♀ in Mus. Paris.

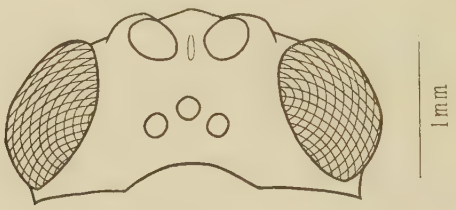
Liopteron immarginatum Kch. sp. n.

Head very strongly transverse, length to interocular breadth = about 1 : 1·5 : emargination behind ocelli deep. Antennal grooves absent: vertex strongly longitudinally ridged. Face with median keel flattened and widening strongly to above clypeus: interantennal keel small. Face and cheeks coarsely punctate, and with fine aciculations directed towards the mouth: mandibles basally similarly aciculate, and with elongate punctures. Cheeks margined to only just below level of eyes. Clypeus mainly sculptured like the face, smooth along apical margin; laterally very distinctly delimited; with indistinct basal pits; apically strongly impressed and narrowly emarginate. Malar space about equal to eye length.

Antennae of male filiform; segments 3, 4 and 5 as 1 (width 0·44) : 1·3 : 1·17 [3]: antennae of female slightly incrassate towards apex, segment 4 the slenderest; segments 3, 4 and 5 as 1 (width 0·4) : 1·21 : 1·14. *Pronotum* strongly transversely ridged dorsally and dorsolaterally, punctate laterally, shining below; with strong median tooth, slightly more elevated in male. *Mesoscutum* regularly transversely ridged, some ridges in anterior half much more outstanding: notaulices strong and percurrent, ending anteriorly in diagonal pits; antero-admedian and parapsidal furrows moderately strong; median furrow scarcely indicated. Scutellum with basal pits each divided by a longitudinal keel, which is weak in some specimens; coarsely reticulate above; laterally bluntly lobate; regularly rounded behind and not margined, with a series of longitudinal ridges, finer in male, which is almost continuous with those of the sides of the scutellum; falling gradually to level of metanotum. Mesopleura bulging and shining, with medial longitudinal furrow uninterrupted; anteriorly and below furrow sparsely piliferous-punctate: anterior upper area very sparsely hairy, dull, separated by a furrow from remainder of mesopleuron. *Metapleura* smooth above, longitudinally ridged below, punctate before spiracle of propodeum. *Propodeum* with longitudinal ridges and fine punctures, irregularly longitudinally ridged beneath; with lateral ridges produced into strong sharp lobes: median area deep, quadrate; median longitudinal

[3] The variation here is greater than seems usual. The unaveraged proportions are for holotype 1 (0·46) : 1·4 : 1·23, for paratype 1 (0·42) : 1·2 : 1·1.

keel not strong. *Petiole* of male nearly as long as remainder of gaster, six to seven times as long as medially broad; of female about 0·36 times length of remainder of gaster, about four times as long as medially broad; with a median furrow, in male strong; with a pair of lateral furrows, below which are four to six keels; laterally very sparsely hairy. Gaster of male not dorsally keeled; tergites 4, 5, 6 and 7 as 37 : 29 : 22·5 : 22; tergites 4–6 sparsely piliferous-punctate in part, 7 densely so. Gaster of female (fig. 13) dorsally keeled from segment 3 hindwards; tergites 4, 5, 6 and 7 as 42 : 71 : 37 : 23; tergites 4 and 5 bearing a few piliferous punctures, tergites 6 and 7 each with a transverse row of same; tergite 8 (♀) with an apical lateral piliferous area; ovipositor sheath with a piliferous groove ventrally and apically. Gaster also bears numerous fine punctures, especially in female, as well as innumerable minute punctures. Tergite 7 produced into a small tooth. *Wings* strongly infuscate, more deeply at base and along costal margin, violescent. Radial cell about six to



12

Fig. 12.—Head of *L. abdominale* Westw. holotype ♀.

seven times as long as broad: cubitalis arising very high on basalis. *Legs* rather slender: hind tibia without apical external tooth.

Black; antennae, legs, and gaster beneath piceous to castaneous; pubescence pale golden-brown.

Length 12–14 mm.

Brazil.

Holotype ♂, paratype ♂ ♀ in Mus. Wien; allotype ♀ in Mus. Budapest. I have been allowed to retain the male paratype.

Liopteron abdominale Westw.

Liopteron abdominale Westwood, 1874, *Thesaur. ent. Oxon.*: 132.
Liopteron abdominale Dalla Torre & Kieffer, 1910, *Das Tierreich* **24**: 31.

Head (fig. 12) length to interocular breadth = 1 : 1·2 : emargination behind ocelli rather deep. Antennal grooves almost absent: vertex strongly longitudinally ridged: stemmaticum strongly raised, shining. Face with short blunt median keel: interantennal keel small. Face and cheeks coarsely and irregularly punctate, and with rather coarse aciculations directed towards middle of face. Clypeus indistinctly delimited; aciculate like the face, and bearing a few less coarse punctures; with distinct basal pits; between pits with longitudinal aciculations leading to a median shining tubercle; apically weakly impressed, subtruncate. Mandibles longitudinally furrowed. Malar space 0·81 eye length. *Antennae* (♀) (pl. 2, fig. 1*b*) almost filiform; segments 3, 4 and 5 as 1 (width 0·44): 1·4 : 1·37. *Pronotum* strongly transversely ridged dorsally and dorso-laterally, irregularly punctate laterally, shining below; with strong median tooth. *Mesoscutum* regularly transversely ridged; some ridges between the notaulices are very strongly outstanding, suggesting saucers on edge, and strong hairs are borne just behind these: notaulices and median furrow percurrent and moderately strong; antero-admedian furrows moderately strong;

parapsidal furrows distinct. Scutellum with undivided basal pits; coarsely reticulate above; with sharp lateral lobes which bear rather fine punctures; broadly rounded behind and not margined, with a series of strong longitudinal ridges, which is continuous with those

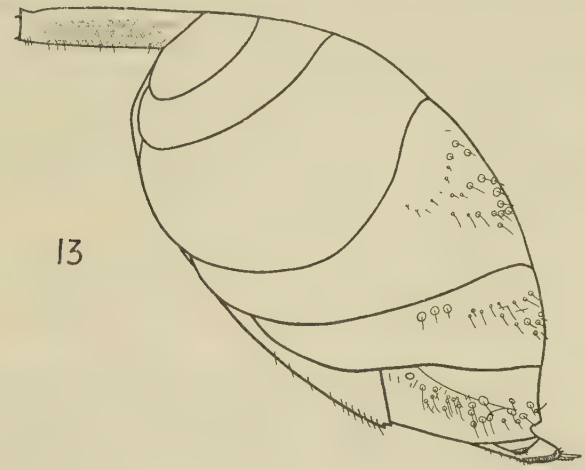


Fig. 13.—Gaster of *L. immarginatum* sp. n. paratype ♀. The number of hairs represented on the third valvulae is not intended to be accurate, but on all other parts of the gaster each individual hair has been drawn.

of the sides of the scutellum; falling rather gradually to level of metanotum. Mesopleura shining, bulging posteriorly above; bearing fine piliferous punctures, especially posteriorly below; with medial longitudinal furrow narrow, divided into a series of deep subquadrate

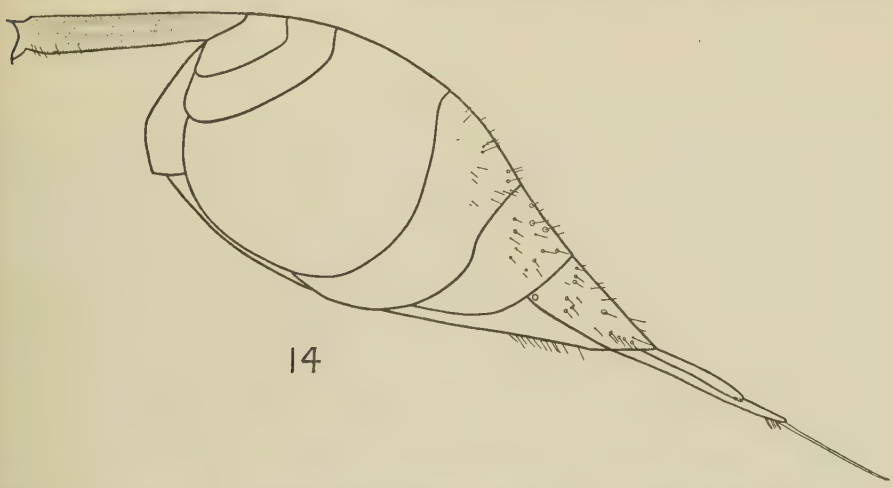


Fig. 14.—Gaster of *L. abdominale* Westw. holotype ♀. Each individual hair has been drawn.

punctures: anterior upper area rather sparsely hairy. *Metapleura* smooth and shining above, coarsely reticulate behind and below. *Propodeum* (fig. 8A) irregularly longitudinally ridged, almost smooth beneath; with lateral ridges produced into strong sharp lobes: median area slightly broader than long; median longitudinal keel weak. *Gaster* (♀) greatly

elongate (fig. 14). Petiole (♀) much less than half length of remainder of gaster, five times as long as medially broad; with a broad median furrow and eight keels; anteriorly with a few lateral hairs. Gaster (♀) dorsally keeled from segment 3 hindwards; tergites 4, 5, 6 and 7 as 43 : 38 : 30 : 41; tergite 8 protruding strongly (length 33 on same scale), basally finely aciculate; tergites 5–7 bearing some piliferous punctures. *Wings* (pl. 2, fig. 1) infumate; fore-wings with broad hyaline fascia at apex of radial cell, and with hyaline area between subcostalis and mediana; hind-wings paler apically, hyaline below subcostalis. Radial cell about four times as long as broad: cubitalis arising well on upper third of basalis. *Hind tibia* without apical external tooth.

Black; mandibles and gaster rufo-castaneous, segments 6–8 dorsally and petiole darker. Pubescence of head white, of body more or less golden-brown.

Length 14·5 mm.

Brazil: Amazons, 1861 (*Bates*).

The elongate rufo-castaneous gaster renders this distinct from all other known species.

In the United States National Museum is a female specimen from Brazil: Santarem (*H. H. Smith*), which Mr. Weld has compared with the above description. The following is compiled from the notes he kindly sent me, and from my own examination of a slide of the wings:—head length to interocular breadth = 1 : 1·04. Antennal segments 3, 4 and 5 as 1 (width 0·45) : 1·45 : 1·39 (31 (14) : 45 : 43). "The lateral lobes of the scutellum I should call prominent and blunt rather than sharp": in the type they are acute-angled, and for lobes they are certainly sharp; though if described as teeth they would be blunt. Median area of propodeum longer than broad. Wings with hyaline areas more extensive; with the hyaline fascia of the fore-wings nearer to the base; with radial cell about 4·7 times as long as broad. Tergites 2–7 entirely red; coxae very dark red. Length 11·9 mm.

Liopteron bicolor Hed. sp. n.

Head strongly transverse, length to interocular breadth = 1 : 1·1 : emargination behind ocelli shallow. Antennal grooves absent: vertex strongly longitudinally ridged. Face medially rather weakly protuberant, reticulate-rugose, laterally shining, with large and small scattered punctures: interantennal keel small. Clypeus finely and irregularly punctate, not delimited; with basal pits obsolete; with a shining, blunt basal median keel; apically with a triangular and strongly impressed projection, narrowly emarginate. Cheeks smooth, with a few large punctures, strongly margined. Mandibles very broad. Malar space longer than eye length. *Antennae* (♂) nearly as long as body, filiform, segments 3, 4 and 5 as 1 : 2·2 : 2·1. *Pronotum* smooth and shining, with some few scattered punctures, scarcely raised medially. *Mesoscutum* very closely transversely ridged: notaulices posteriorly indicated; median furrow absent; strong ridges are developed in place of the antero-admedian and parapsidal furrows. Scutellum with basal pits very large and shining; moderately reticulate above; with strong lateral lobes; regularly rounded behind and not margined; falling rather gradually to level of metanotum. The keel separating the basal pits is produced backwards on to the disc: anteriorly it does not reach the base, but is surrounded by a horseshoe-shaped keel. *Mesopleura* bulging and shining, with medial furrow broken up into a series of nearly quadrangular punctures; with a few scattered punctures above and below: anterior upper area smooth and very sparsely piliferous-punctate, separated by a weak ridge from remainder of mesopleuron. Metapleura and propodeum very coarsely and irregularly reticulate: lateral ridges of propodeum produced

into strong crenate lobes : median area longer than broad ; median keel strong. *Petiole* (♂) a little longer than remainder of gaster, seven times as long as medially broad ; with a median furrow ; with a fairly strong median keel anteriorly ; with eight to ten other keels below. Gaster (♂) not keeled dorsally ; tergites 4, 5, 6 and 7 as 20 : 18 : 15 : 15 ; tergites 5–7 with a few piliferous punctures, very small on tergite 5. *Wings* strongly infumate, violescent : fore-wings nearly as long as body. Radial cell about four times as long as broad : cubitalis arising well on upper third of basalis. *Legs* very long and slender : hind tibia without apical external tooth.

Black ; mandibles castaneous with black teeth ; thorax cinnabar-red ; gaster (except black petiole) castaneous brown, dorsally black.

Length 14 mm., antennae 12 mm., fore-wings 13 mm.

Bolivia : Coroico. Holotype ♂ in Mus. Univ. Berlin.

A very remarkable species, fairly characterised by the colour and sculpture of the thorax.

Liopteron levilaterale Kch. sp. n.

Head not strongly transverse, length to interocular breadth = 1 : 1·15 : emargination behind ocelli rather shallow. Antennal grooves very strong, shining. Face medially strongly protuberant, with very strong, sharp median keel, which is continuous with the rather weak interantennal keel. Face with coarse and rather fine punctures : cheeks below with coarse punctures, above with sparse fine punctures. Clypeus not delimited ; striato-punctate, the striations directed towards the mouth ; with small but deep basal pits ; with a median basal tubercle ; apically strongly impressed. Malar space = 0·82 eye length. *Antennae* (♀) very slightly incrassate to apex ; segments 3, 4 and 5 as 1 (width 0·5) : 2·0 : 1·8. *Pronotum* coarsely punctate dorsally, laterally smooth and shining, finely and very sparsely punctate ; its smooth hind margin raised above mesoscutum, medially weakly emarginate. *Mesoscutum* regularly transversely ridged medially, anteriorly and laterally smooth and shining, with a very few fine punctures : notaulices strong and percurrent, ending in small circular pits anteriorly, cutting completely through transverse ridges in posterior half ; median furrow posterior and very short ; antero-admedian and parapsidal furrows distinct but extremely weak. Scutellum with basal pits separated by a weak keel ; smooth and shining antero-laterally, postero-medially, and posteriorly, with irregularly scattered fine punctures ; coarsely punctate laterally and behind pits ; laterally not lobate ; regularly rounded behind and not margined ; falling gradually to level of metanotum. Mesopleura shining, in upper half strongly bulging ; with medial longitudinal furrow narrow, divided into a series of quadrangular pits, running anteriorly and posteriorly into series of larger pits which extend down the margins of the pleuron : anterior upper area shining, bearing a few strong hairs. Mesosternum medially transversely ridged. *Metapleura* very strongly lobate above ; coarsely sculptured above and behind, smooth and shining below. *Propodeum* with longitudinal ridges, smooth below ; with lateral ridges very strong and crenate, not lobate : median area quadrate ; median longitudinal keel weak. *Petiole* (♀) about three-fifths length of remainder of gaster, about five and a half times as long as medially broad ; with a shallow median furrow and eight longitudinal keels. Gaster (♀) dorsally keeled from segment 3 hindwards, keel also very faintly evident on segment 2 ; tergites 4, 5, 6 and 7 as 51 : 37 : 18 : 12 ; tergites 5–7 bearing rows of piliferous punctures ; tergite 8 (♀) very finely striato-punctate. Tergite 7 produced into a sharp tooth. *Wings* (pl. 2, fig. 3) very strongly and almost uniformly infumate, except for a bright fulvous patch which includes all but base of radial cell, and a paler fulvous streak along base of costal margin. Radial cell four times as long as broad : cubitalis arising just on upper third of basalis. *Legs* rather slender : hind tibia with very small apical external tooth.

Black; mandibles except apically, thorax and abdomen bright castaneous; fore legs piceous to castaneous.

Length 12–13 mm.

Brazil: Rio de Janeiro, Orgãos mountains, Tijuca massif, v.1902 (*E. R. Wagner*).

Holotype ♀ in Mus. Paris.

Species-group *nigrum*.

Liopteron intermedium Kch. sp. n.

Head coarsely reticulate; length to interocular breadth = 1 : 1·37 : emargination behind ocelli moderately shallow. Antennal grooves well developed, finely striato-punctate and densely piliferous anteriorly, smooth and shining posteriorly. Face with coarse and rather fine punctures; medially scarcely protuberant, without median keel: interantennal tooth rather strong, its keel extending almost to median ocellus. Cheeks bulging; with coarse punctures, and with aciculations directed towards the mouth. Clypeus irregularly striato-punctate, not delimited; with large basal pits; with an elongate, smooth median protuberance; apically slightly impressed; with distinct smooth apical margin, not emarginate. Malar space 0·8 eye length. *Antennae* (♀) clavate and scarcely compressed, segment 12 as 1·21 : 1 : 1·04; segments 3, 4 and 5 as 1 (width 0·43) : 1·45 : 1·24; with a very few rhinaria on segment 3 and many on segment 4. *Pronotum* coarsely reticulate, with inconspicuous median tooth. *Mesoscutum* medially with sharp transverse ridges, some in anterior third very strongly outstanding; laterally coarsely reticulate: notaulices and median furrow percurrent and moderately strong, completely interrupted by transverse ridges; median furrow greatly narrowed anteriorly; antero-admedian furrows moderately strong; parapsidal furrows distinct. Scutellum with basal pits shallow, imperfectly divided; dorsally coarsely reticulate; laterally weakly lobate; apically incised; falling suddenly to level of metanotum. Mesopleura shining, bulging behind; with medial longitudinal furrow irregularly divided; below furrow coarsely piliferous-punctate posteriorly, finely so medially; above furrow with a few piliferous punctures; along anterior margin with a vertical row of pits, one bounded above and below by sharp ridges: anterior upper area rather densely hairy. Mesopleuron divided from mesosternum anteriorly by a dull elongate pit, medially by a strong ridge, and posteriorly by a shining circular pit. *Metapleura* coarsely reticulate. *Propodeum* irregularly longitudinally ridged, and with rather fine punctures; with lateral ridges very strong and crenate, not lobate: median area broader than long; median longitudinal keel rather strong. *Petiole* (♀) 0·35 times length of remainder of gaster, 3·33 times as long as medially broad; with a strong median furrow and ten longitudinal keels, the dorsal and dorso-lateral more or less coalesced. Gaster (♀) dorsally keeled from segment 3 hindwards, falling rather suddenly behind; tergites 4, 5, 6 and 7 as 55 : 27 : 20·5 : 15; tergites 5–7 dorsally and dorso-laterally piliferous-punctate. *Fore-wings* with apical half in greater part hyaline; in basal half and around and including radial cell luteous to infuscate: hind-wings in greater part hyaline, basally and along fore-margin infuscate: fore- and hind-wings with an infumate apical margin. Radial cell four times as long as broad: cubitalis arising on upper third of basalis. *Hind tibia* with strong apical external tooth.

Black; mandibles rufous except at apex.

Length 10 mm.

Brazil: Santarem, ix. (*H. H. Smith*).

Holotype ♀ in U.S. Nat Mus. (cat. no. 53568).

Of the known species in group *nigrum*, this approaches nearest to group *compressum*.

Liopteron intermedium var. **autazense** Kch. var. n.

Differs from the typical form as follows: antennal grooves anteriorly finely aciculate. Clypeus laterally coarsely reticulate; not striato-punctate; without distinct smooth apical margin. Mesoscutum with no transverse ridges to be described as very strongly outstanding. Scutellum with basal pits not shallow. Petiole with minute median keel. Wings in basal half infuscate, in apical half hyaline.

Antennae (♂) slightly compressed, segment 12 as 3·12 : 1 : 1·24; segments 3, 4 and 5 as 1 (width 0·43) : 1·52 : 1·48. *Petiole* (♂) 0·65 times length of remainder of gaster, 4–4½ times as long as medially broad; medially distinctly narrowed. Gaster (♂) not dorsally keeled; tergites 4, 5, 6 and 7 as 44 : 19 : 16 : 24.

Length 7–9 mm.

Brazil: Amazons, Autaz, ix–x. (*A. Roman*).

Holotype ♂ and paratype in Mus. Stockholm.

Agrees with the typical form in most characters; yet there are differences other than those attributable to sexual dimorphism.

Liopteron birói Kch. sp. n.

Head coarsely reticulate; length to interocular breadth = 1 : 1·43: emargination behind ocelli moderately shallow. Antennal grooves strong and shining. Face medially slightly protuberant to above clypeus; with blunt median keel: interantennal tooth rather strong. Clypeus rather coarsely striato-punctate, not delimited; with small but rather deep basal pits; with strong median basal tubercle and weak median basal keel; apically rather broadly smooth, impressed and weakly emarginate. Malar space 0·74 eye length. *Antennae* (♀) clavate and strongly compressed, segment 11 as 1·74 : 1 : 1·65; segments 3, 4 and 5 as 1 (width 0·39) : 1·21 : 1·19; segment 4, like the following, with rhinaria, fewer above and along outer edge. *Pronotum* coarsely reticulate, with very small median tooth. *Mesoscutum* medially with sharp transverse ridges, those between notaulices strongly outstanding, suggesting saucers on edge; laterally coarsely reticulate: notaulices strong and percurrent, greatly widened anteriorly, broken through by transverse ridges; median furrow percurrent and very strong, greatly narrowed anteriorly, broken into but not through by transverse ridges; antero-admedian and parapsidal furrows indicated. Scutellum dorsally coarsely reticulate; laterally strongly lobate; falling suddenly to level of metanotum. Mesopleura with an irregularly-divided medial longitudinal furrow; below this they are posteriorly coarsely punctate, medially smooth and shining, sparsely and very finely piliferous-punctate, and bear anteriorly a transversely-divided oval pit; above furrow smooth and shining, with an elongate pit: anterior upper area sparsely hairy. *Metapleura* coarsely reticulate. *Propodeum* irregularly reticulate; with lateral ridges strong, weakly lobate: median area broader than long; median longitudinal keel strong. *Petiole* (♀) one-third length of remainder of gaster, 2·45 times as long as medially broad; with an almost flat dorsal surface bearing a minute median keel and four other keels, which are irregular and do not attain the apex of the petiole; with six complete longitudinal keels; with a very weak median ventral furrow; laterally sparsely hairy. Gaster (♀) dorsally keeled from segment 3 hindwards, falling rather suddenly behind; tergites 4, 5, 6 and 7 as 57 : 28 : 19 : 15; tergites 5–7 dorsally piliferous-punctate to piliferous-reticulate. *Wings* (pl. 2, fig. 4) basally strongly infuscate, apically hyaline. Radial cell 3·8 times as long as broad: cubitalis arising just on upper third of basalis. *Hind tibia* with apical external tooth sharp, moderately strong.

Black; mandibles rufous except at apex; gaster beneath castaneous to piceous.

Length 10 mm.

Peru : Pachitea.

Holotype ♀ in Mus. Budapest.

This species is dedicated to the late Dr. J. Biró, Honorary Curator of Hymenoptera in the Hungarian National Museum of Zoology. Dr. Biró was interested in Cynipoidea, and had some manuscript keys to genera and species which extended those of Kieffer (1910). To the specimens of Liopteridae he attached labels with manuscript names; but these names, most of which were too cumbersome, have not been retained.

Liopteron subpetiolatum Westw.

Liopteron subpetiolatum Westwood, 1874, *Thesaur. ent. Oxon.* : 133.
Liopteron subpetiolatum Dalla Torre & Kieffer, 1910, *Das Tierreich* **24** : 33.

Head coarsely reticulate; length to interocular breadth = 1 : 1·32 : emargination behind ocelli moderately deep. Antennal grooves well marked, shining. Face medially protuberant to above clypeus; with strong median keel and interantennal tooth. Clypeus centrally very finely punctate, somewhat shining, marginally finely striato-punctate; indistinctly delimited; with shallow basal pits; with a distinct median basal tubercle and

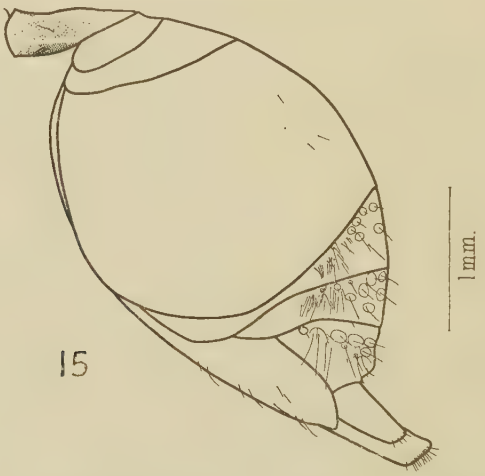


Fig. 15.—Gaster of *L. subpetiolatum* Westw. holotype ♀. All hairs drawn accurately.

keel; apically weakly impressed, not emarginate. Malar space 0·73 eye length. *Antennae* (♀) clavate and strongly compressed, segment 11 as 1·45 : 1 : 1·55; segments 3, 4 and 5 as 1 (width 0·35) : 1·25 : 1·05. *Pronotum* coarsely reticulate, with very small but sharp median tooth. *Mesoscutum* medially with rather sharp transverse ridges, laterally coarsely reticulate : notaulices and median furrow percurrent and moderately strong, the latter greatly narrowed anteriorly; antero-admedian and parapsidal furrows scarcely indicated. Scutellum with basal pits separated by a short keel; dorsally coarsely reticulate; laterally rather weakly lobate; falling suddenly to level of metanotum. Mesopleura with an irregularly-divided medial longitudinal furrow which is sharply reflected posteriorly; below furrow they are coarsely punctate along posterior margin, in greater part smooth and shining, rather sparsely and very finely piliferous-punctate, and bear anteriorly an undivided vertical oval pit; above furrow smooth and shining : anterior upper area moderately strongly and densely hairy. *Metapleura* coarsely reticulate. *Propodeum* as in *fuscicorne* Westw., but with lateral ridges rather weak. *Petiole* (♀) 0·21 times length of remainder of gaster, twice

as long as medially broad; with a weak median keel and six other longitudinal keels; laterally sparsely hairy. Gaster (♀) (fig. 15) dorsally keeled from segment 3 hindwards, falling rather suddenly behind; tergites 4, 5, 6 and 7 as 42 : 17·5 : 12 : 12; tergites 5–7 dorsally piliferous-punctate, dorso-lateral pilosity on tergite 4 very distinct. *Fore-wings* (pl. 2, fig. 5) with apical half in greater part hyaline; basally and around and including radial cell luteous to infuscate; with an incomplete infuscate fascia below cubital cell and a weak infuscate patch below apex of radial cell: hind-wings with apical half in greater part hyaline; basally infuscate: fore- and hind-wings with an infumate apical margin. Radial cell 4·3 times as long as broad: cubitalis arising on upper third of basalis. *Hind tibia* with small apical external tooth.

Black; head and scape largely rufous; remainder of antennae, legs and gaster beneath rufo-castaneous to piceous.

Length 7 mm.

Brazil: Amazons, 1861 (*Bates*).
Holotype ♀ in Hope Museum, Oxford.

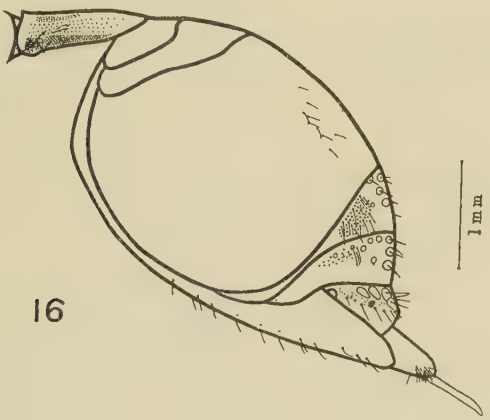


Fig. 16.—Gaster of *L. fuscicorne* Westw. holotype ♀. All hairs drawn accurately.

Liopteron laticeps Kch. sp. n.

Head (fig. 18) coarsely reticulate; length to interocular breadth = 1 : 1·6: emargination behind ocelli shallow. Antennal grooves smooth but incomplete. Face slightly protuberant to above clypeus; with median keel distinct above, absent below; and with strong interantennal tooth. Clypeus not delimited, striato-punctate, laterally smoother; with large basal pits; with a median basal tubercle above a very weak smooth median keel; apically slightly impressed and emarginate. Cheeks strongly produced behind. Malar space 0·87 eye length. *Antennae* in unique type broken off beyond segment 5; but fifth segment somewhat compressed (1 : 1·22), therefore probably antennae clavate and strongly compressed; segments 3, 4 and 5 as 1 (width 0·37): 1·1 : 1·04. *Pronotum* coarsely reticulate, with small median tooth. *Mesoscutum* medially with transverse ridges, laterally coarsely reticulate: notaulices and median furrow percurrent; antero-admedian furrows distinct; parapsidal furrows indicated. Scutellum with basal pits separated by a short keel, each imperfectly divided; coarsely reticulate behind basal pits; laterally strongly lobate; incised posteriorly; falling suddenly to level of metanotum. Mesopleura as in *L. scaberrimum* (Kieff.). *Metapleura* coarsely and irregularly reticulate; with a rather strong lobe above. *Propodeum* irregularly longitudinally ridged; with lateral ridges strong

and crenate, not lobate: median area broader than long; median longitudinal keel not strong. *Petiole* (♂) one-half length of remainder of gaster, 2·8 times as long as medially broad; with a very strong median keel and six other keels; dorsally in second and third quarters transversely ridged; laterally and ventro-laterally sparsely hairy. Remainder of gaster (♂) not dorsally keeled; tergites 4, 5, 6 and 7 as 43 : 17 : 12·5 : 19; tergite 5 sparsely set with coarse piliferous punctures dorsally, tergites 6 and 7 so densely set with these as to be reticulate; pilosity on tergite 4 minute and inconspicuous. *Wings* (pl. 2, fig. 6) basally dark, apically hyaline: radial cell and beyond luteous, with no clouded area at apex. Radial cell 4·5 times as long as broad: cubitalis arising on upper quarter of basalis. *Hind tibiae* with small apical external tooth.

Black; mandibles except apices rufous; clypeus, antennae, fore and mid legs, hind tarsi, and gaster beneath rufo-castaneous to piceous.

Length 8 mm.

Brazil: Fonteboa.
Holotype ♂ in Mus. Budapest.

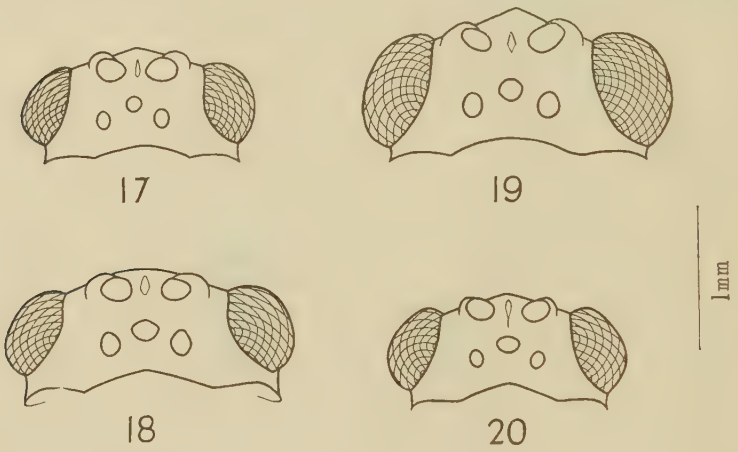


Fig. 17.—Head of *L. scaberrimum* (Kieff.) lectotype ♂.
Fig. 18.—Head of *L. laticeps* sp. n. holotype ♂.
Fig. 19.—Head of *L. fuscicorne* Westw. holotype ♀.
Fig. 20.—Head of *L. clavicorne* Westw. holotype ♀.

Liopteron scaberrimum (Kieff.).

Peras scaberrimum Dalla Torre, 1910, *Ent. Jahrb.* **20** : 179 (*nomen nudum*).
Peras scaberrimum Kieffer, 1911, *Boll. Soc. ent. Ital.* **41** : 250.

Head (fig. 17) coarsely reticulate; length to interocular breadth = 1 : 1·3 : emargination behind ocelli shallow. Antennal grooves well developed, shining. Face slightly protuberant to above clypeus; with blunt median keel and with strong interantennal tooth. Clypeus striato-punctate, not delimited; with shallow basal pits; with a blunt median basal keel; apically slightly impressed but not emarginate. Malar space about 0·7 eye length. *Antennae* (♂) as long as body, clavate and very strongly compressed, segment 12 as 2·38 : 1 : 2·25; segments 3, 4 and 5 as 1 (width 0·35) : 1·1 : 1·07. *Pronotum* coarsely reticulate, with small, blunt median tooth. *Mesoscutum* medially with rather sharp transverse ridges, laterally coarsely reticulate: notaulices and median furrow percurrent; antero-admedian and parapsidal furrows distinct. Scutellum with basal pits separated by a short

keel; dorsally coarsely reticulate; laterally weakly lobate; broadly rounded behind; falling suddenly to level of metanotum. Mesopleura with an irregularly-divided medial longitudinal furrow, which is curved upward anteriorly and sharply reflected posteriorly; below this they are posteriorly coarsely punctate, medially rather finely so, and bear anteriorly a deep transversely-divided oval pit: anterior upper area rather strongly and thickly hairy. *Metapleura* coarsely reticulate. *Propodeum* very coarsely reticulate; lateral ridges moderately strong, not distinctly lobate: median area broader than long; median longitudinal keel strong. *Petiole* (♂) more than half length of remainder of gaster, 2·3 times as long as medially broad; with a very strong median keel and six other keels; dorsally in second and third quarters transversely ridged, also with some ventro-lateral transverse ridges in paratype. Remainder of gaster (♂) not dorsally keeled; tergites 4, 5, 6 and 7 as 32 : 12 : 9 : 17; tergite 5 sparsely set with coarse piliferous punctures dorsally, tergites 6 and 7 so densely set with these as to be reticulate; dorso-lateral pilosity of tergite 4 less distinct than in *L. fuscicorne* Westw. (fig. 16); last sternite with a piliferous posterior projection. *Wings* basally dark, apically hyaline: fore-wing with a clouded area at apex of radial cell. Radial cell about four times as long as broad: cubitalis arising just on upper third of basalis. *Hind femora* moderately swollen: hind tibia with small apical external tooth.

Black; head and antennae rufous; nota, legs in part, and gaster beneath piceous to rufo-castaneous.

Length 6–7 mm.

Two ♂ syntypes in British Museum.

Kieffer gave as localities "Brésil; Mexique: Villanueva". The former specimen (B.M. 62. 56.) must be taken as the lectotype, unfortunately, for it is not the better specimen. Paratype B.M. 55. 44.

Liopteron fenestratum Ashm.

Liopteron fenestratum Ashmead, 1895, *Proc. ent. Soc. Wash.* **3**: 177.
Liopteron fenestratum Dalla Torre & Kieffer, 1910, *Das Tierreich* **24**: 32.

Mr. L. H. Weld has examined the types of this species and of *L. scaberrimum* (Kieff.), and thought them to be conspecific; but a note on this was not published. He has very kindly sent a description of *L. fenestratum* to compare with the descriptions I had sent him of it and other species, and I can separate the two only upon the relative lengths of the petiole. Under the regulations in force at the two museums a direct comparison of the types is impossible: if they should be conspecific, Ashmead's name would, of course, have the priority. The following is very slightly modified in form from Mr. Weld's description:—

Male:—head from above broader than thorax (33·5 : 30); length (16) to interocular breadth (19) as 1 : 1·2 (emargination 1·0); from in front broader than high (33·5 : 30). Vertex coarsely punctured: antennal grooves bare, smooth. Face coarsely punctured, medially protuberant; with a median keel obsolete before reaching clypeus: interantennal tooth blunt, prominent, its keel extending to median ocellus. Cheeks very narrow and margined only below middle of eyes. Clypeus not delimited; without basal pits; apically with radiating ridges and fine punctures, not emarginate. Malar space 0·7 times eye length. Interocular space = 0·56 times transfacial and area 1·3 times as broad as high (14·5). *Antenna* length = 3·5 times width of head; lengths of segments as (scape) 27 (width 14) : 11 (11) : 30 (10) : 35 : 33 : 33 : 33 : 32 : 30 : 29 : 30 : 28 : 25 : 45; segment 12 as 28 : 11 : 27. *Pronotum* laterally coarsely reticulate; its truncation margined above and produced into a distinct, triangular, median dorsal tooth. *Mesoscutum* coarsely sculptured medially, with

about eight sharp, discontinuous transverse ridges, less regular anteriorly, reticulate over tegulae: notaulices broad, percurrent; median furrow deep, narrow, percurrent; antero-admedian and parapsidal furrows not distinct. Scutellum with basal pits almost circular, shining, deep, flat-bottomed, separated by a thin septum, the two making 0·6 of width of base of scutellum, a pit being broader than the adjacent lateral space; dorsally coarsely reticulate; laterally prominently angled; broadly truncate behind and not emarginate; in profile not overhanging metanotum. Mesopleura with a broad longitudinal furrow crossed by about five low vertical ridges; below furrow with a few punctures posteriorly and scattered ones anteriorly; above furrow with two depressions: anterior upper area shining and with fine pubescence. Mesosternum with a few transverse ridges. *Metapleura* coarsely reticulate. *Propodeum* with three sharp, straight longitudinal carinae, the enclosed quadrate area being crossed at its upper third by a transverse ridge: on underside of the neck is a median and two widely-diverging lateral ridges: in side view the neck of the propodeum is sulcate and placed asymmetrically, the dorsal distance being oblique but shorter than the ventral. *Abdomen* longer than head plus thorax (69 : 58). Petiole (♂) 0·56 times length of remainder of gaster, 3·3 times as long as medially broad (94 : 28); with a broad dorsal groove in which is a strong median carina forked anteriorly; dorsally in second and third quarters transversely ridged: the ventral groove is narrow: the upper of the two grooves on the side of the petiole is broader behind, the lower broader in front: six keels in all. Tergite 2 has no median dorsal impression: the exposed parts of the last three are coarsely punctate and pubescent: the last two are keeled, the last more distinctly so: the next to last is strongly arcuate in profile and the last dentate anteriorly: lengths of tergites measured along dorsal curvature as (petiole) 26 (width 8) : 6 : 8 : 19 : 8 : 7 : 10. *Fore-wing* (pl. 2, fig. 7) pubescent, ciliate only on subcostal margin and anal angle: first cubital cell infuscated: a cloud centred on apex of radial cell extends back to the cubitalis. Radial cell 4·6 times as long as broad (92 : 20), with a spur at proximal lower corner: cubitalis arising on upper third of basalis. Fore-wing length 2·8 times width of head. Hind-wing with a slight round cloud in exact centre. *Segments of hind-leg* as (coxa) 22 (width 10) : (trochanter and femur) 26 (10) : 27 : 36 : femur with scattered punctures: tibia sculptured, with more and longer hairs; with two carinae on inner face and one distinct one on outer, ending in a short, triangular apical tooth: hind claws simple.

Black; head, except the black occiput, rufous.

Length 6·0 mm.

Brazil: Santarem (*H. H. Smith*).
Holotype ♂ in U.S. Nat. Mus. (cat. no. 23644).

Liopteron nigrum (Westw.).

Peras nigra Westwood, 1837, *Mag. Zool.* **7** (Ins. explic. tab. 179) : 2, fig. 2.
Perus niger Dalla Torre, 1893, *Catalogus Hymenopterorum* **2** : 11.
Peras reticulatum Kieffer, 1910, *Boll. Lab. Zool. Portici* **4** : 108, **syn. n.**
Peras nigrum Dalla Torre & Kieffer, 1910, *Das Tierreich* **24** : 33.

Head coarsely reticulate; length to interocular breadth = 1 : 1·48: emargination behind ocelli rather shallow (condition intermediate between that in *L. fuscicorne* Westw. (fig. 19) and that in *L. clavicorne* Westw. (fig. 20)). Antennal grooves distinct, shining. Face with rather coarse and moderately fine punctures; medially protuberant to above clypeus; with strong median keel, blunt below, sharp above: interantennal tooth blunt, moderately strong. Clypeus moderately finely striato-punctate, distinctly delimited; with small but deep basal pits; with a distinct median basal tubercle and keel; apically impressed, with a smooth apical margin, scarcely emarginate. Malar space 0·67 eye length. *Antennae* (♀) clavate and strongly compressed, segment 12 as 1·72 : 1 : 1·63; segments 3, 4 and 5 as 1 (width 0·33) : 1·33 : 1·13; segment 4 with a few rhinaria. *Pronotum* coarsely

reticulate, with very small median tooth. *Mesoscutum* medially with rather sharp transverse ridges, laterally coarsely reticulate: notaulices and median furrow percurrent and moderately strong, the latter greatly narrowed anteriorly; antero-admedian furrows scarcely indicated; parapsidal furrows weak. Scutellum with basal pits separated by a short keel; dorsally coarsely reticulate; laterally weakly lobate; falling suddenly to level of metanotum. Mesopleura as in *L. fuscicorne* Westw., but anterior upper area sparsely hairy. *Metapleura* coarsely reticulate. *Propodeum* irregularly longitudinally ridged, diagonally ridged beneath; with lateral ridges moderately strong, not distinctly lobate: median area approximately quadrate, its sides converging posteriorly; median longitudinal keel strong. *Petiole* (♀) 0·3 times length of remainder of gaster, 2·81 times as long as medially broad; with a very strong median keel and six other longitudinal keels, of which the dorsals are bifurcate anteriorly; laterally sparsely hairy. Gaster (♀) dorsally keeled from segment 3 hindwards, falling gradually behind; tergites 4, 5, 6 and 7 as 49 : 19 : 13 : 13; tergites 5–7 dorsally piliferous-punctate, dorso-lateral pilosity on tergite 4 rather inconspicuous; tergite 6 bituberculate; tergite 7 distinctly angular in side view. *Wings* in basal half rather strongly infuscate, with apical half luteous to hyaline, in greater part hyaline. Radial cell four times as long as broad: cubitalis arising on upper third of basalis. *Hind tibia* with rather small apical external tooth.

Black; mandibles basally rufous; gaster beneath castaneous.

Length 9½ mm.

French Guiana: Cayenne (*Lacordaire*).

Holotype ♀ in Mus. Univ. Berlin.

The discovery was made by Hedicke that Kieffer (1910) founded the species *L. reticulatum* upon the holotype of *L. nigrum* (Westw.). Kieffer quotes the number 8007 which the specimen bears: this is the catalogue number of the holotype of *L. nigrum* (Westw.).

Liopteron fuscicorne Westw.

Liopteron fuscicorne Westwood, 1874, *Thesaur. ent. Oxon.*: 132.
Liopteron fuscicorne Dalla Torre & Kieffer, 1910, *Das Tierreich* **24**: 32.

Head (fig. 19) coarsely reticulate; length to interocular breadth = about 1 : 1·4: emargination behind ocelli shallow. Antennal grooves distinct, shining. Face medially strongly protuberant to above clypeus; with strong median keel and interantennal tooth. Clypeus finely striato-punctate, indistinctly delimited; with shallow basal pits; with a strong median basal keel; apically impressed and weakly emarginate. Malar space 0·65 to 0·7 eye length. *Antennae* (♀) clavate and strongly compressed, segment 11 as 1·57 : 1 : 1·65; segments 3, 4 and 5 as 1 (width 0·35) : 1·27 : 1·0. *Pronotum* coarsely reticulate, with small median tooth. *Mesoscutum* medially with rather sharp transverse ridges, laterally coarsely reticulate: notaulices percurrent, but only moderately strong; median furrow percurrent, strong posteriorly, weaker and greatly narrowed anteriorly; antero-admedian and parapsidal furrows scarcely indicated. Scutellum coarsely reticulate behind basal pits; laterally strongly lobate; falling suddenly to level of metanotum. Mesopleura with an irregularly divided medial longitudinal furrow, curving upward anteriorly, sharply reflected posteriorly; below this they are posteriorly coarsely punctate, medially smooth and shining, sparsely and very finely piliferous-punctate, and bear anteriorly a deep transversely-divided oval pit; above furrow smooth and shining, with a shallow pit: anterior upper area rather strongly and densely hairy. *Metapleura* coarsely reticulate. *Propodeum* (fig. 8B) irregularly longitudinally ridged, diagonally ridged beneath; with lateral ridges moderately strong, not distinctly lobate: median area broader than long; median longitudinal keel rather strong. *Petiole* (♀) about 0·28 times length of remainder of gaster, 2½–3 times as long as medially broad; with a very strong median keel and six other longitudinal keels; laterally sparsely

hairy. Gaster (♀) dorsally keeled from segment 3 hindwards, falling rather gradually behind (fig. 16); tergites 4, 5, 6 and 7 as 51 : 19·5 : 14 : 12·5 (type); tergites 5–7 dorsally piliferous-punctate, dorso-lateral pilosity on tergite 4 very distinct (fig. 16). *Wings* (pl. 3, fig. 1) in apical half hyaline, basally and marginally luteous to infuscate. Radial cell about four times as long as broad: cubitalis arising just on upper third of basalis. *Hind tibia* with small apical external tooth.

Black; head in part, antennae, fore and mid tibiae and tarsi, and gaster beneath piceous to rufo-castaneous; pubescence mainly pale stramineous, that on scutellum often darker.

Length 8–9 mm.

Brazil: Amazons, 1861 (*Bates*).

Holotype ♀ and three other ♀ specimens in Hope Museum, Oxford.

Liopteron clavicorne Westw.

Liopteron clavicorne Westwood, 1874, *Thesaur. ent. Oxon.*: 132.
Liopteron clavicorne Dalla Torre & Kieffer, 1910, *Das Tierreich* **24**: 32.

Head (fig. 20) coarsely reticulate; length to interocular breadth = 1 : 1·31 : emargination behind ocelli moderately shallow. Antennal grooves distinct, shining. Face medially strongly protuberant to above clypeus; with strong median keel and interantennal tooth. Clypeus finely striato-punctate, indistinctly delimited; with shallow basal pits; with a strong median basal keel; apically weakly impressed, not emarginate. Malar space 0·68 eye length. *Antennae* (♀) clavate and very strongly compressed, segment 11 as 1·56 : 1 : 1·83; segments 3, 4 and 5 as 1 (width 0·32) : 1·27 : 1·08. *Pronotum* coarsely reticulate, with small median tooth. *Mesoscutum* medially with rather sharp transverse ridges, laterally coarsely reticulate: notaulices and median furrow percurrent, but completely interrupted by transverse ridges; notaulices rather weak; median furrow weak, greatly narrowed anteriorly; antero-admedian and parapsidal furrows indicated. Scutellum coarsely reticulate behind basal pits; laterally strongly lobate; falling suddenly to level of metanotum. Mesopleura as in *L. fuscicorne* Westw. *Metapleura* coarsely reticulate. *Propodeum* as in *L. fuscicorne* Westw. *Petiole* (♀) 0·28 times length of remainder of gaster, 2·55 times as long as medially broad; with a very strong median keel and six other longitudinal keels; laterally sparsely hairy. Gaster (♀) dorsally keeled from segment 3 hindwards (very indistinctly on segment 3), falling gradually behind; tergites 4, 5, 6 and 7 as 39·5 : 11 : 9 : 10·5; tergites 5–7 dorsally piliferous-punctate, dorso-lateral pilosity on tergite 4 very distinct. *Wings* (pl. 2, fig. 8) in apical half hyaline, basally and at apex of radial cell luteous to infuscate. Radial cell 4·2 times as long as broad: cubitalis arising just on upper third of basalis. *Hind tibia* with small apical external tooth.

Rufo-castaneous to piceous; head and antennae largely rufous, stemmaticum darker.

Length 6½ mm.

Brazil: Amazons, 1861 (*Bates*).

Holotype ♀ in Hope Museum, Oxford.

Very similar to *L. fuscicorne* Westw. Apart from the characters given in the key, it differs therefrom in having relatively weak notaulices and median furrow on the mesoscutum.

Species-group *bifasciatum*.

Liopteron bifasciatum Westw.

Liopteron bifasciatum Westwood, 1874, *Thesaur. ent. Oxon.*: 132.
Liopteron bifasciatum Dalla Torre & Kieffer, 1910, *Das Tierreich* **24**: 32.

Head (fig. 21) coarsely reticulate; length to interocular breadth = 1 : 1·3 : emargination behind ocelli shallow. Antennal grooves well marked, shining. Face with a pair of large,

shallow pits; medially protuberant; with blunt median keel: interantennal tooth sharp and rather strong, its keel produced weakly almost to median ocellus. Clypeus not delimited; coarsely reticulate like the face; with indistinct basal pits; apically smooth and moderately strongly impressed. Malar space 0·67 eye length. *Antennae* (♂) slightly compressed, segment 12 as 2·11 : 1 : 1·33; segments 3, 4 and 5 as 1 (width 0·52) : 1·57 : 1·5. *Pronotum* coarsely reticulate, without median tooth. *Mesoscutum* medially with rather sharp transverse ridges, laterally coarsely reticulate: notaulices percurrent, rather strong, broadening behind; median furrow distinct, extending forwards to beyond centre (there obscured by pin in the type); antero-admedian and parapsidal furrows indicated. Scutellum with rather small basal pits, coarsely reticulate behind them; with inconspicuous lateral lobes; posteriorly strongly bidentate and emarginate; falling suddenly to level of metanotum. Mesopleura in greater part smooth and shining; with medial longitudinal furrow uninterrupted; below with a few coarse punctures posteriorly, some fine piliferous punctures medially, and a transversely-divided oval pit anteriorly: anterior upper area strongly

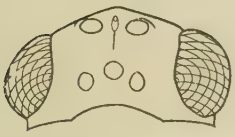


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Fig. 21.—Head of *L. bifasciatum* Westw. holotype ♂.

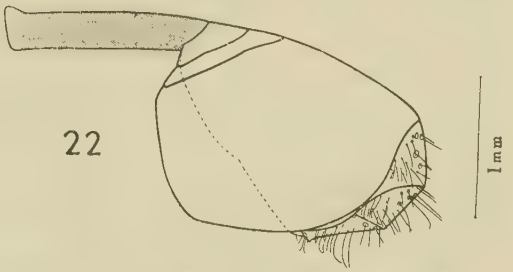

Fig. 22.—Gaster of *L. bifasciatum* Westw. holotype ♂. All hairs drawn accurately.

and densely hairy. Mesosternum finely punctate, not transversely ridged; medially behind with two large blunt teeth, which form the anterior margins of the coxal cavities. *Metapleura* coarsely reticulate. *Propodeum* (fig. 8c) with lateral ridges strong and crenate, not lobate: median area longer than broad, its sides curved; median longitudinal keel moderately strong. *Petiole* (♂) 0·75 times length of remainder of gaster, 4·8 times as long as medially broad; with a strong median furrow and ten longitudinal keels. Gaster (♂) (fig. 22) not dorsally keeled; tergites 4, 5, 6 and 7 as 34 : 14 : 12 : 16; tergites 5–7 strongly but rather sparsely piliferous-punctate. *Fore-wings* bifasciate: hind-wings apically infuscate. Radial cell 3¼ times as long as broad: cubitalis arising just on upper third of basalis. *Hind tibia* with moderately strong apical external tooth.

Black; antennae, mandibles apically, and legs basally piceous; mandibles basally, legs apically and gaster beneath castaneous; pubescence pale stramineous.

Length 6 mm.

Brazil: Amazons, 1861 (*Bates*).
Holotype ♂ in Hope Museum, Oxford.

Liopteron weldi Kch. sp. n.

Head coarsely reticulate; length to interocular breadth = 1 : 1·23: emargination behind ocelli deep. Antennal grooves finely striato-punctate. Face with coarse and fine punctures; medially slightly protuberant to above clypeus, with median keel moderately strong: interantennal tooth strong, its keel produced almost to median ocellus. Clypeus not delimited, with large basal pits; with a narrow median basal keel running to a much broader median apical smooth furrow; with fine punctures and with striae directed towards the mouth; apically weakly emarginate. Malar space 0·65 eye length. *Antennae* (♀)

much longer than head, thorax and propodeum; slightly compressed, segment 11 as 1·25 : 1 : 1·3; segments 3, 4 and 5 as 1 (width 0·47) : 1·33 : 1·17; segment 4, like the following, with rhinaria, but with very few along outer edge. *Pronotum* coarsely reticulate, with hind margin slightly raised medially, but not into a tooth. *Mesoscutum* with rather sharp transverse ridges, laterally coarsely reticulate: notaulices percurrent but rather weak, scarcely indenting the transverse ridges; median furrow rather narrow, not reaching anterior margin of scutum; antero-admedian furrows absent, parapsidal furrows indicated. Scutellum with rather shallow basal pits; dorsally coarsely reticulate; with rather strong lateral lobes; posteriorly strongly bidentate and emarginate; falling suddenly to level of metanotum. Mesopleura in greater part smooth and shining, densely and finely piliferous below; with medial longitudinal furrow broad, weakly and irregularly interrupted, reflected anteriorly and posteriorly; anteriorly below with a transversely-divided oval pit: anterior upper area rather strongly and densely hairy. Mesosternum strongly transversely ridged: anterior margins of cavities of mid coxae in the form of strong ridges, but not toothed. *Metapleura* coarsely reticulate. *Propodeum* with lateral ridges rather strong and weakly crenate, not lobate; coarsely reticulate before them, irregularly longitudinally ridged behind: median area longer than broad, its sides divergent; median longitudinal keel strong. *Petiole* (♀) one-half length of remainder of gaster, 3½ times as long as medially broad; with a broad median furrow and ten longitudinal keels. Gaster (♀) dorsally keeled from segment 5 hindwards; not falling suddenly behind; tergite 3 strongly transversely impressed; tergites 4, 5, 6 and 7 as 42 : 14 : 8·5 : 6·5; tergites 5–7 strongly piliferous-punctate dorso-laterally; tergite 7 strongly rounded dorsally. *Fore-* and *hind-wings* bifasciate. Radial cell 3½ times as long as broad: cubitalis arising at middle of basalis. *Hind tibia* with strong apical external tooth.

Black; antennae rufo-castaneous to piceous; mandibles, palpi, tegulae, and gaster beneath rufo-castaneous; legs rufo-castaneous, hind tibiae and metatarsi black.

Length 7 mm.

Brazil: Benevides, vii. (*H. H. Smith*).
Holotype ♀ in U.S. Nat. Mus. (cat. no. 53569).

Liopteron rufipes (Kieff.).

Heterocynips rufipes Dalla Torre, 1910, *Ent. Jahrb.* **20**: 179 (*nomen nudum*).
Heterocynips rufipes Kieffer, 1911, *Boll. Soc. ent. Ital.* **41**: 252.

Head (fig. 23) coarsely reticulate; length to interocular breadth = 1 : 1·17; emargination behind ocelli somewhat shallow. Antennal grooves distinct, striato-punctate in front, shining behind. Face with coarse punctures and with striae directed towards the mouth; medially broadly protuberant; with weak median keel: interantennal tooth small, its keel produced almost to median ocellus. Clypeus not delimited; with indistinct basal pits; with a small, sharp median basal keel; with striae directed towards the mouth, becoming finer apically; apically smooth, weakly impressed, not emarginate. Malar space 0·64 eye length. *Antennae* (♀) much longer than head, thorax, and propodeum; somewhat clavate and compressed, segment 11 as 1·3 : 1 : 1·3; segments 3, 4 and 5 as 1 (width 0·54) : 1·54 : 1·23; segment 4 without rhinaria. *Pronotum* coarsely reticulate, with hind margin slightly raised medially, but not into a distinct tooth. *Mesoscutum* medially with rather sharp transverse ridges, laterally coarsely reticulate: notaulices percurrent and moderately strong; median furrow not quite attaining anterior margin; antero-admedian and parapsidal furrows absent. Scutellum with basal pits smooth and rather shallow; dorsally coarsely reticulate; with weak lateral lobes; posteriorly bidentate and emarginate; falling suddenly to level of metanotum. Mesopleura in greater part smooth and shining; with medial longitudinal furrow uninterrupted, reflected anteriorly and posteriorly; below furrow irregularly pili-

ferous-punctate posteriorly, finely and more regularly so behind the anterior transversely-divided oval pit: anterior upper area strongly and densely hairy. Mesosternum elongately reticulate, not transversely ridged: anterior margins of cavities of mid coxae in the form of strong ridges, produced into small teeth internally. *Metapleura* coarsely reticulate. *Propodeum* (fig. 8*d*) irregularly longitudinally ridged; with lateral ridges moderately strong and scarcely crenate: median area longer than broad, its sides slightly curved; median longitudinal keel rather strong. *Petiole* (♀) 0·44 times length of remainder of gaster, about 3½ times as long as medially broad; with a strong median furrow and ten longitudinal keels. Gaster (♀) dorsally keeled from segment 5 hindwards, falling suddenly behind; tergites 4, 5, 6 and 7 as 40·5 : 13 : 10·5 : 8; tergites 5–7 strongly piliferous-punctate, smooth behind and below; tergite 7 not rounded dorsally, not at an angle to tergite 6. *Fore-wings* bifasciate: hind-wings hyaline, apically infuscate. Radial cell 3·3 times as long as broad: cubitalis not arising on upper third of basalis. *Hind tibia* with rather strong apical external tooth.

Black; antennae, gaster, and hind tibiae and tarsi rufo-castaneous to piceous; mandibles except apices and clypeus rufo-castaneous; legs rufous.

Length 6½ mm.

Brazil: Amazons, Ega.
Holotype ♀ in British Museum (59. 10.).

Liopteron brevicorne Kch. sp. n.

Head (fig. 24) coarsely reticulate; length to interocular breadth = 1 : 1·47: emargination behind ocelli deep. Antennal grooves distinct, shining, partly very finely punctate.

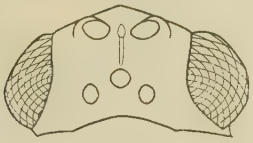

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Fig. 23.—Head of *L. rufipes* (Kieff.) holotype ♀.

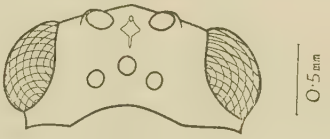

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Fig. 24.—Head of *L. brevicorne* sp. n. holotype ♀.

Face with coarse and fine punctures; medially protuberant, but with no median keel: interantennal tooth distinct, its keel produced almost to median ocellus. Clypeus not delimited, with indistinct basal pits; with a basal median keel ending basally in a small tubercle; with ridges directed towards the mouth and a few very fine punctures; apically weakly impressed, not emarginate. Malar space 0·74 eye length. *Antennae* (♀) short, scarcely longer than head, thorax and propodeum, very slightly compressed, strongly clavate, segment 11 as 1 : 1 : 1·04; segments 3, 4 and 5 as 1 (width 0·68) : 1·22 : 1·09; segment 4, like the following, with rhinaria. *Pronotum* coarsely reticulate, with hind margin slightly raised medially, but not into a tooth. *Mesoscutum* with some rather sharp but not strongly raised transverse ridges, laterally coarsely reticulate: notaulices percurrent, rather strong, broadening slightly behind; median furrow distinct, completely interrupted and greatly narrowed anteriorly; antero-admedian and parapsidal furrows indicated. Scutellum with basal pits separated by a strong keel, each imperfectly longitudinally divided; dorsally coarsely reticulate; with inconspicuous lateral lobes; posteriorly rather strongly bidentate and emarginate; falling suddenly to level of metanotum. Mesopleura with medial longitudinal furrow uninterrupted, rather narrow, reflected anteriorly and posteriorly; smooth and shining above furrow, sparsely and finely piliferous-punctate below it; anteriorly below with an indistinctly transversely-divided oval pit: anterior upper area strongly and densely hairy. Mesosternum irregularly transversely rugose:

anterior margins of cavities of mid coxae in the form of strong ridges, but not toothed. Metapleura very irregularly coarsely reticulate. *Propodeum* with lateral ridges strong and crenate, stronger above but not lobate, irregularly longitudinally ridged behind them: median area quadrate; median longitudinal keel strong. *Petiole* (♀) 0·45 times length of remainder of gaster, $3\frac{1}{2}$ times as long as medially broad; with a strong median furrow and eight main longitudinal keels. Gaster (♀) dorsally keeled from segment 5 hindwards, also with indications of dorsal keel on segments 3 and 4, falling suddenly behind; tergites 4, 5, 6 and 7 as 35·5 : 15 : 11 : 8; tergites 5–7 dorsally coarsely piliferous-punctate anteriorly, finely so medially, entirely smooth posteriorly. *Fore-wings* bifasciate, less strongly infuscate basally: hind-wings infuscate, hyaline basally. Radial cell four times as long as broad: cubitalis arising just below upper third of basalis. *Hind tibia* produced into a moderately strong apical external lobe, but not into a tooth.

Rufo-castaneous to black; palpi, fore coxae, and eighth segment of gaster pale rufous. Length $6\frac{1}{2}$ mm.

Brazil: Amazons, Teffé, vi.1906 (*A. Ducke*).
Holotype ♀ in Mus. Budapest.

Liopteron tarsale Ashm.

Liopteron tarsale Ashmead, 1895, *Proc. ent. Soc. Wash.* **3** : 177.
Liopteron tarsale Dalla Torre & Kieffer, 1910, *Das Tierreich* **24** : 31.
Liopteron tarsale Weld, 1922, *Proc. U.S. nat. Mus.* **61** (18) : 5.
Liopteron tarsale Weld, 1922, *Philipp. J. Sci.* **21** : pl. 1, fig. 4.

The following is very slightly modified from Mr. Weld's description, which was written to compare with the descriptions I sent him of *L. bifasciatum* Westw., *L. unifasciatum* Westw., and *L. brevicorne* sp. n. :—

Female :—head from above broader than thorax (31 : 27); length to interocular breadth = 1 : 1·06 (16 : 17): emargination on same scale 3: from in front broader than high (31 : 27). Vertex coarsely punctured: antennal grooves with fine setigerous punctures. Face coarsely punctured on a finely punctured background; medially protuberant, without median keel; richly pubescent: interantennal tooth distinct, its keel extending almost to median ocellus. Clypeus not delimited; without distinct basal pits or median keel but with fine radiating ridges and setigerous punctures; apically not emarginate. Malar space 0·61 eye length (30 : 49). Interocular space 0·55 times transfacial and area 1·2 times as broad as high (14). *Antenna* length 2·45 times width of head: flagellum gradually stouter to apex, not laterally compressed: lengths of segments as (scape) 19 (width 12) : 9 (11) : 18 (10) : 25 : 24 : 23 : 21 : 20 : 20 : 20 : 19 : 17 : 25 (17). *Pronotum* laterally coarsely punctate; margined laterally but not medially, the hind margin raised into a low, broad median tooth. *Mesoscutum* coarsely sculptured medially, with eight to nine sharp, discontinuous transverse ridges separated by rectangular depressions, laterally coarsely punctate: notaulices broad; median furrow not so broad; antero-admedian and parapsidal furrows not distinct. Scutellum with basal pits smooth and shallow, longer than broad, separated by a low septum, together forming only two-fifths of width of base of scutellum, a pit being narrower than the adjacent lateral space; dorsally coarsely reticulate; not prominently angled laterally; distinctly bidentate and emarginate behind, the teeth in profile distinctly overhanging the metanotum. Mesopleura with medial longitudinal furrow reflected posteriorly; below furrow with setigerous punctures; above furrow bare and polished: anterior upper area pubescent. Mesosternum with a transverse ridge in front of mid coxae and a median and a lateral ridge, the enclosed area very faintly sculptured. *Metapleura* reticulate. *Propodeum* with three almost straight longitudinal carinae, the lateral slightly stouter; with lateral ridges prominent: median area approximately quadrate. In side view the neck of the propodeum is sulcate and placed so that the dorsal slope is shorter than the ventral.

Abdomen about equal in length to head plus thorax (53 : 52). Petiole 0·66 times length of remainder of gaster, 3·5 times as long as medially broad (73 : 21); with a broad dorsal groove and eight longitudinal keels. Tergite 2 has a small, round, shallow, median dorsal impression : the next two are faintly, the last three distinctly keeled : the last in profile is slightly arcuate : the last three have lateral punctate pubescent areas : lengths of tergites as (petiole) 21 : 5 : 4 : 23 : 9 : 7 : 4. *Fore-wing* (pl. 2, fig. 10) pubescent and ciliate, bifasciate, with apical fourth clear : a clear transverse band includes the basal two-thirds of the radial cell : a cloud, darker anteriorly, is centred on the apex of the radial cell and another cloud, narrower in front, includes the basal and second transverse veins : the first and second basal cells are clear. Radial cell 3·74 times as long as broad (86 : 23) : cubitalis arising above middle of basalis. Fore-wing length 2·93 times width of head. Hind-wing uniformly clouded. Segments of *hind leg* as (coxa) 19 (width 13) : (trochanter and femur) 35 (10) : 28 (5) : 28 : femur polished, with scattered setigerous punctures : tibia with a network of ridges and many punctures, more densely pubescent on inner face; with apical external tooth not prominent : hind metatarsus much shorter than segments 2–5 together (36 : 65), with claws simple.

Black.

Length 5·3 mm.

Brazil : Amazons, Santarem, ii. (*H. H. Smith*). Mexico.

Holotype ♀ in U.S. Nat. Mus. (cat. no. 23643). Mexican specimen (♀) in coll. Philadelphia Academy of Natural Sciences (det. L. H. Weld).

Liopteron rufum Ashm.

Liopteron rufum Ashmead, 1895, *Proc. ent. Soc. Wash.* **3** : 178.
Liopteron rufum Dalla Torre & Kieffer, 1910, *Das Tierreich* **24** : 30.

The following is very slightly modified from Mr. Weld's description, which was written to compare with the descriptions I sent him of *L. bifasciatum* Westw., *L. unifasciatum* Westw., and *L. brevicorne* sp. n. :—

Female :—head from above broader than thorax (36 : 33); length to interocular breadth = 1 : 1·1 (19 : 21) : emargination on same scale 3·5 : from in front broader than high (36 : 31). Vertex coarsely punctured : antennal grooves shallow, dull, with fine setigerous punctures. Face pubescent, with coarse round and also fine punctures; medially protuberant, without median keel : interantennal tooth distinct, its keel produced almost to median ocellus. Cheeks not broadened behind the eyes, sharply margined. Clypeus not delimited; without basal pits or median keel; laterally with fine oblique ridges, medially smoother; apically not emarginate. Malar space 0·72 eye length. Interocular space 0·55 times transfacial and area 1·3 times as broad as high (21 : 16). *Antennae* short, with flagellum gradually stouter distally, segment 11 as 18 : 17 : 18 : lengths of segments as (scape) 23 : 11 : 16 (width 12) : 22 : 19 : 18 : 17 : 17 : 18 : 18 : 18 : 18 : 34 (17). *Pronotum* laterally coarsely punctate, without transverse ridges; with truncation sharply margined laterally but not medially; with hind margin raised into a low, median dorsal tooth. *Mesoscutum* coarsely transversely sculptured medially, with eight or nine sharp ridges separated by large rectangular lacunae in transverse rows, extreme lateral margins coarsely punctate : notaulices broad and percurrent; median furrow not so broad and not quite percurrent; antero-admedian furrows represented by indistinct ridges; parapsidal furrows indistinct. Scutellum with basal pits smooth and shallow, broader than long, separated by a narrow septum, a pit being broader than the adjacent lateral space; dorsally coarsely reticulate; scarcely angled on lateral margin; apparently rounded behind when viewed from directly above, but in oblique view two elevations in the sculpture suggest two teeth

with a broad emargination between; in profile not overhanging the metanotum. Mesopleura with medial longitudinal furrow curving upward anteriorly, broadened posteriorly; below furrow with a few scattered punctures posteriorly and a large pit anteriorly; above furrow smooth and bare: anterior upper area pubescent. Mesosternum with a longitudinal ridge along each pleurosternal suture, a weak median ridge, and a ridge in front of the mid coxae; with the enclosed area faintly transversely striate. *Metapleura* reticulate. *Propodeum* with three straight longitudinal carinae, the lateral stouter; with lateral ridges present: median area approximately quadrate, crossed by two low transverse ridges. In side view the neck of the propodeum is longitudinally sulcate and not quite symmetrically placed, the dorsal slope being shorter than the ventral. *Abdomen* shorter than head plus thorax (61 : 64). Petiole 0·58 times length of remainder of gaster, 3·1 times as long as medially broad; with a broad dorsal groove and eight longitudinal keels. Tergite 2 has a median, dorsal, shallow, egg-shaped depression: the rest are dorsally keeled: the last three have lateral punctate pubescent areas: lengths of tergites as (petiole) 25 (width 8) : 5 : 6 : 26 : 11 : 9 : 5. *Fore-wing* (pl. 2, fig. 9) pubescent and ciliate, clear at base and apex: the intervening area is clouded except for an elongate clear spot in base of radial cell and a round one above anal angle, i.e. these do not form a continuous clear band across the wing. Radial cell 3·5 times as long as broad. Distal two-thirds of hind-wing infuscated. Segments of *hind leg* as (coxa) 22 (width 13) : (trochanter and femur) 37 (13) : 32 (6) : 30 : femur with scattered hairs: tibia with a network of ridges and punctures, the inner face more densely pubescent; with apical external tooth prominent: hind metatarsus much shorter than segments 2–5 together (33 : 56).

Rufous; mandibles apically black, flagellum piceous.

Male:—sculptured like the female, but lacking the transverse ridges between carinae on propodeum. Lengths of segments of antennae as (scape) 17 : 10 : 21 (width 11) : 30 : 30 : 32 : 30 : 29 : 29: the remainder are missing, but last slightly compressed (12 : 13). Petiole one-half length of remainder of gaster, 3·6 times as long as medially broad. Tergite 2 has an oval dorsal depression: the rest are unkeeled: lengths of tergites as (petiole) 74 (width 22) : 20 : 24 : 65 : 30 : 26 : 29.

Length of female 5·85 mm., of male 4·75 mm.

Brazil: Chapada, xi. (*H. H. Smith*).
Holotype ♀ and allotype ♂ in U.S. Nat. Mus. (cat. no. 23642).

Liopteron unifasciatum Westw.

Liopteron unifasciatum Westwood, 1874, *Thesaur. ent. Oxon.*: 133.
Liopteron unifasciatum Dalla Torre & Kieffer, 1910, *Das Tierreich* **24**: 32.

Head coarsely reticulate; length to interocular breadth = about 1 : 1·4: emargination behind ocelli rather deep. Antennal grooves very well marked, shining. Face with coarse punctures, and with irregular slanting transverse ridges; medially protuberant, with strong median keel: interantennal tooth strong, its keel produced very weakly almost to median ocellus. Clypeus not delimited; with a pair of small but distinct ovate basal pits and a median tubercle; in apical third strongly transversely impressed as in the Ichneumonid genus *Pimpla*, the impression shining and almost smooth; not apically emarginate. Malar space 0·59 eye length. *Antennae* (♂) longer than head and body, clavate and compressed, segment 12 as 1·77 : 1 : 1·41; segments 3, 4 and 5 as 1 (width 0·44) : 1·37 : 1·37. *Pronotum* coarsely reticulate, with strong median tooth. *Mesoscutum* with only about six transverse ridges, which extend almost to its sides, laterally narrowly reticulate: notaulices percurrent, very broad behind; median furrow percurrent, broadening behind; antero-admedian and parapsidal furrows scarcely indicated. Scutellum longer than medially broad; with small basal pits; dorsally coarsely reticulate; without lateral lobes;

posteriorly bidentate and weakly emarginate, falling suddenly to level of metanotum. Mesopleura with very broad medial furrow, broadening behind; below furrow sparsely piliferous, with a few punctures posteriorly and anteriorly, along anterior margin finely striate; above furrow smooth: anterior upper area strongly and densely hairy. Mesosternum not transversely ridged: anterior margins of cavities of mid coxae strongly raised, and produced into a strong median tooth. *Metapleura* coarsely reticulate. *Propodeum* irregularly longitudinally ridged; with lateral ridges not strong, crenate, or lobate: median area longer than broad; median longitudinal keel not strong. *Petiole* (♂) 0·73 times length of remainder of gaster, 3·9 times as long as medially broad; with a very weak median keel in a broad but shallow median furrow, which narrows posteriorly but almost attains the apex; with eight other longitudinal keels; ventro-laterally with a few hairs. Gaster (♂) not dorsally keeled; tergites 4, 5, 6 and 7 as 31 : 14 : 14 : 18; tergites 5–7 dorsally coarsely piliferous-punctate. *Fore-wings* unifasciate: hind-wings apically infuscate. Radial cell 3·6 times as long as broad: basal abscissa of cubitalis colourless, arising from mid point of basalis. *Hind tibia* with minute apical external tooth.

Castaneous to black; scape, palpi, and tegulae rufous; legs rufous, hind tibiae and metatarsi castaneous.

Length 4½ mm.

Brazil: Amazons, 1861 (*Bates*).
Holotype ♂ in Hope Museum, Oxford.

Liopteron westwoodii Cam.

Leiopteron westwoodii Cameron, 1883, *Biol. Centr.-Amer., Hym.* **1**: 75, pl. 4, fig. 12.
Liopteron westwoodii Dalla Torre, 1893, *Cat. Hym.* **2**: 12.
Liopteron westwoodi Dalla Torre & Kieffer, 1910, *Das Tierreich* **24**: 30.

Head coarsely reticulate; length to interocular breadth = 1 : 1·2: emargination behind ocelli shallow. Antennal grooves distinct, anteriorly striato-punctate. Face medially slightly protuberant, with indistinct median keel: interantennal tooth moderately strong, its keel produced to median ocellus. Clypeus distinctly delimited; with distinct basal pits; with a broad median basal keel; basally and laterally coarsely reticulate like the face, otherwise with ridges directed towards the mouth; distinctly impressed in apical half; scarcely emarginate. Malar space 0·75 eye length. *Antennae* (♀) clavate but not compressed, segment 11 broader than long; segments 3, 4 and 5 as 1 (width 0·46) : 1·36 : 1·21; segment 4, like the following, with rhinaria. *Pronotum* coarsely reticulate, without median tooth. *Mesoscutum* coarsely reticulate: notaulices percurrent, running into subrectangular pits anteriorly and posteriorly; median furrow starting as a five-sided pit, running forward to beyond middle of mesoscutum; antero-admedian and parapsidal furrows absent. Scutellum coarsely reticulate behind basal pits; with inconspicuous lateral lobes; posteriorly obtusely bidentate; falling suddenly to level of metanotum. Mesopleura in greater part smooth and shining, piliferous-punctate behind and below; with medial furrow reflected anteriorly and posteriorly: anterior upper area rather strongly and densely hairy. Mesosternum irregularly rugose, not transversely ridged: anterior margins of cavities of mid coxae broken medially, produced into small blunt teeth internally. *Metapleura* coarsely reticulate. *Propodeum* irregularly reticulate; with lateral ridges strong and crenate, not lobate; median area longer than broad; median longitudinal keel moderately strong. *Petiole* (♀) 0·65 times length of remainder of gaster, 5·1 times as long as medially broad; with a weak median furrow and ten longitudinal keels, of which the two dorsal on each side unite before apex. Gaster (♀) dorsally keeled from segment 3 hindwards, falling suddenly behind; tergites 4, 5, 6 and 7 as 29 : 15 : 11 : 8; tergites 5–7 densely piliferous-punctate, smooth behind; tergite 7 not rounded dorsally, not at an angle to tergite 6: last sternite large and strongly projecting. *Fore-wings* with a single dark fascia:

hind-wings hyaline, infuscate at extreme apex. Radial cell three times as long as broad: cubitalis not arising on upper third of basalis. *Hind tibia* without apical external tooth.

Rufous; antennae except scape, hind tibiae, propodeum dorsally and gaster castaneous to piceous.

Length $6\frac{1}{3}$ mm.

PANAMA: Vulcan de Chiriqui, 2500–4000 ft. (*Champion*).
Holotype ♀ in British Museum.

Liopteron confusum Hed. sp. n.

Liopteron bifasciatum Hedicke, 1914, *Deuts. ent. Z.* **1914**: 634.

Head coarsely reticulate; length to interocular breadth = 1 : 1·25: emargination behind ocelli deep. Antennal grooves well marked, somewhat shining. Face with rather strong median keel and interantennal tooth. Clypeus not delimited; with small basal pits close together; apically weakly impressed and very weakly emarginate. Malar space about 0·6 eye length. *Antennae* clavate, moderately compressed, segment 11 as 1·17 : 1 : 1·38; segments 3, 4 and 5 as 1 (width 0·34) : 1·17 : 1·12. *Pronotum* coarsely reticulate, with strong median tooth. *Mesoscutum* medially with rather sharp transverse

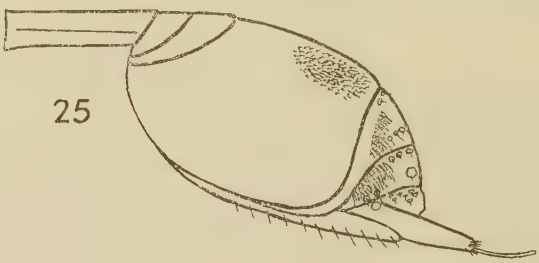

FIG. 25.—Gaster of *L. confusum* sp. n. holotype ♀.

ridges, laterally coarsely reticulate: notaulices percurrent, rather strong, broadening behind; median furrow percurrent; antero-admedian and parapsidal furrows indistinct Scutellum with rather large quadrangular basal pits; dorsally coarsely reticulate, with small lateral lobes; posteriorly shallowly emarginate and bidentate; falling suddenly to level of metanotum. Mesopleura smooth and shining; with medial longitudinal furrow very broad and broken up into a series of large punctures; below with a number of fine piliferous punctures anteriorly and a few coarse punctures posteriorly: anterior upper area large, strongly and densely hairy. *Metapleura* coarsely reticulate. *Propodeum* with lateral ridges strong and somewhat crenate, not lobate: median area a little longer than broad; median longitudinal keel moderately strong. *Petiole* (♀) nearly half as long as remainder of gaster, about four times as long as medially broad; with a strong median furrow and eight longitudinal keels. Gaster (♀) (fig. 25) dorsally keeled from segment 3 hindwards; tergites 4, 5, 6 and 7 as 35 : 14 : 10 : 5; tergites 4–7 strongly piliferous-punctate, tergite 4 bearing almost as much hair as does tergite 5; tergite 7 produced into two small teeth and a blunt median tooth. *Fore-wings* (fig. 26) bifasciate; hind-wings apically infuscate. Radial cell 3·3 times as long as broad; cubitalis arising just on upper third of basalis. *Hind femora* rather strongly swollen: hind tibiae with strong apical external tooth: hind metatarsi weakly but distinctly curved.

Black; mandibles (except margin), fore and mid legs and hind coxae reddish-brown:

pubescence pale stramineous, that on upper area of mesopleura and on metanotum silvery-white.

Length 8·2 mm. : antenna 5 mm. : fore-wing 6 mm.

Peru : Vilcanota.

Holotype ♀ in Mus. Univ. Berlin.

The species is well characterised by the great development of pilosity on tergite 4 of the gaster and by the colour of the legs. It was erroneously referred to *L. bifasciatum* Westw. (Hedicke, 1914 : 634).

Liopteron ruficeps (Kieff.).

Peras ruficeps Kieffer, 1905, *Bull. Soc. Metz* (2) **12** : 110.
Peras ruficeps Dalla Torre & Kieffer, 1910, *Das Tierreich* **24** : 33.

Brazil : Goyas, Jatahy.

The location of the unique male type is unknown to us, and we have no information beyond that given by Kieffer. It is, of course, possible that

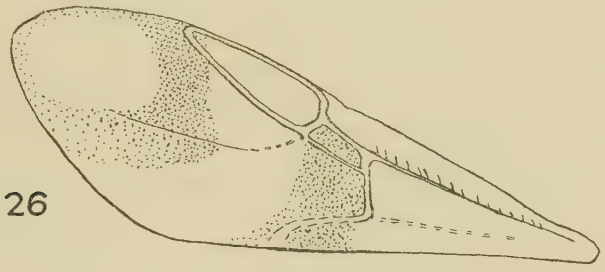

Fig. 26.—Fore-wing of *L. confusum* sp. n. holotype ♀.

either of the following species may later have to be synonymised with *L. ruficeps* (Kieff.).

Liopteron brasiliense Hed. sp. n.

Head coarsely reticulate, length to interocular breadth = 1 : 1·3; shallowly emarginate behind ocelli. Antennal grooves large and shining. Face with strong median keel and interantennal tooth. Clypeus laterally indistinctly delimited; less coarsely reticulate than the face; with large basal pits and short median basal keel; apically weakly impressed. Malar space about 0·7 eye length. *Antennae* (♀) clavate and strongly compressed, segment 11 as 1·25 : 1 : 1·75; segments 3, 4 and 5 as 1 : 1·4 : 1·1. *Pronotum* coarsely reticulate, with median tooth. *Mesoscutum* medially with rather sharp transverse ridges, laterally coarsely reticulate : notaulices and median furrow strong and percurrent; antero-admedian furrow obsolete; parapsidal furrows indistinct. Scutellum coarsely reticulate; with shining basal pits; moderately lobate laterally; very weakly emarginate behind; falling suddenly to level of metanotum. Mesopleura with a broad irregularly-divided medial furrow, reflexed posteriorly; anteriorly below with an irregular transversely-divided pit; behind this irregularly very finely piliferous-punctate, coarsely so behind; above medial furrow smooth and shining, with a very shallow pit : anterior upper area strongly and rather densely hairy. *Metapleura* coarsely reticulate. *Propodeum* with lateral ridges strong and somewhat crenate, stronger above but not truly lobate : median area nearly as long as broad, with strong median keel. *Petiole* (♀) 0·4 times length of remainder of gaster, a little more than twice as long as medially broad; with strong median keel, by aberration divided; below with six longitudinal keels. Gaster (♀) (fig. 28) dorsally keeled from tergite 3 hindwards;

tergites 4, 5, 6 and 7 as 25 : 13 : 10 : 5; tergite 4 dorso-laterally with a few small hairs, tergites 5–7 dorsally coarsely, dorso-laterally densely and finely piliferous-punctate. *Fore-wings* (fig. 27) bifasciate : hind-wings infumate. Radial cell 3·3 times as long as broad :

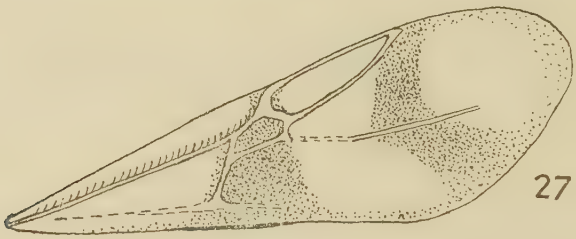

Fig. 27.—Fore-wing of *L. brasiliense* sp. n. ♀.

cubitalis arising on upper third of basalis. *Hind femora* moderately swollen : hind tibiae with strong apical external tooth.

Black; head, except stemmaticum, reddish-brown; antennae brown; gaster dark castaneous; pubescence pale.

Length 7–8 mm.; antenna 5 mm.; fore-wing 5·5–6 mm.

Brazil : Rio de Janeiro, Santa Thereza Mts., Sumaré, holotype, 7.i.1929, paratype 19.i.1929 (*O. Conde*).

Holotype ♀ and paratype in coll. Hedicke.

Kerrich has examined both the above specimens, and agrees that they are clearly specifically identical. In the Berlin University and Budapest museums are six other specimens, differing from these and from each other in small detail, which is mainly of a relative nature. Kerrich's manuscript notes on these six specimens will be duplicated and sent to these and some other museums.

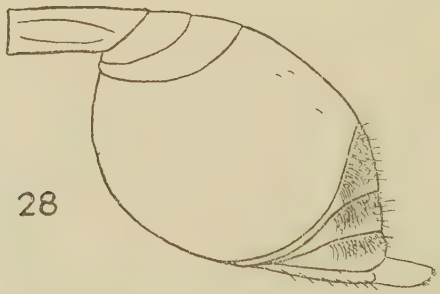

Fig. 28.—Gaster of *L. brasiliense* sp. n. ♀.

Liopteron antennale Kch. sp. n.

Head coarsely reticulate; length to interocular breadth = 1 : 1·35 : emargination behind ocelli moderately deep. Antennal grooves well marked, shining, finely striate in part. Face not medially protuberant, with weak median keel and blunt interantennal tooth. Clypeus indistinctly laterally delimited, with large deep basal pits; medially raised and striate; in apical third very strongly transversely impressed as in the Ichneumonid genus *Pimpla*, the impression finely irregularly punctate and shining; apically very weakly and broadly emarginate. Malar space 0·75 eye length. *Antennae* (♀) clavate and strongly

compressed, segment 11 as 1·27 : 1 : 1·82; segments 3, 4 and 5 as 1 : 1·02 : 0·91; segment 4 with a very few rhinaria. *Pronotum* coarsely reticulate, with small median tooth. *Mesoscutum* medially with some rather sharp transverse ridges, laterally coarsely reticulate: notaulices strong and percurrent; median furrow strong, but completely interrupted anteriorly; antero-admedian and parapsidal furrows absent. Scutellum with rather large sub-quadrangular basal pits; dorsally coarsely reticulate; with small lateral lobes; apically almost truncate; falling rather suddenly to level of metanotum: sides not normally regularly vertically ridged, but with four strong ridges limiting five areas, postero-median, postero-lateral, and lateral; the remaining ridges weak and incomplete. Mesopleura with a broad irregularly-divided medial longitudinal furrow, which is reflexed posteriorly; below furrow finely piliferous-punctate, anteriorly and posteriorly with large pits; above furrow with smaller pits: anterior upper area strongly and densely hairy. Mesosternum finely rugose: anterior margins of cavities of mid coxae in the form of strong ridges, with small blunt teeth internally. *Metapleura* coarsely and very irregularly reticulate. *Propodeum* with lateral ridges strong, weakly crenate, not lobate: median area longer than broad, very

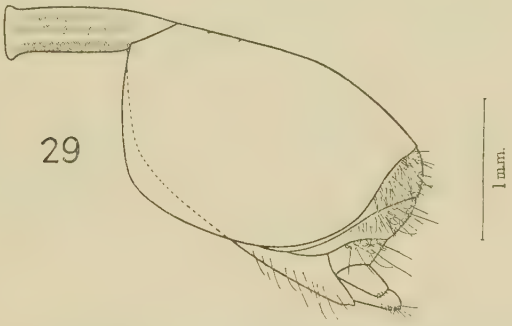

Fig. 29.—Gaster of *L. antennale* sp. n. holotype ♀. All hairs drawn accurately.

shallow, its sides diverging, its lateral keels very broad and smooth, median longitudinal keel weak. *Petiole* (♀) 0·48 times length of remainder of gaster, 3·2 times as long as medially broad; with a median keel in anterior third, in a broad but shallow median furrow, which narrows posteriorly but almost attains the apex; with six lateral and ventro-lateral longitudinal keels. Gaster (♀) (fig. 29) dorsally keeled from segment 5 hindwards, not sharply on segment 5, falling suddenly behind; tergites 4, 5, 6 and 7 as 43 : 10 : 10 : 6·5; tergites 5–7 strongly piliferous-punctate, 7 coarsely so, 5 and 6 dorsally coarsely, dorso-laterally finely so; ovipositor sheaths each with an apical row of strong hairs: sutures separating tergites 2 and 3 and tergites 3 and 4 obsolete, only seen dorsally. *Fore-wings* bifasciate: hind-wings apically infuscate. Radial cell four times as long as broad: cubitalis not arising on upper third of basalis. *Hind tibia* with weak apical external tooth.

Black; head, fore and mid legs, and hind coxae, trochanters, and tibial spurs rufous; body beneath and hind tarsi castaneous.

Length 6 mm.

Brazil: Amazons, Manãos.

Holotype ♀ in Mus. Budapest.

The only described species with the fifth antennal segment shorter than the third.

In the Oxford University Museum is a female specimen differing from the above principally as follows: antennal grooves shagreened, not shining. Clypeus with basal pits large but not deep, not striate medially. Segment 4 of ♀ antenna without rhinaria; segment 5 above with fewer than have the following

segments. Mesoscutum with transverse ridges much weaker: owing to the unfortunate pinning it is impossible to describe the median furrow. Scutellum with rather small basal pits separated by a short keel: sides regularly ridged. Mesopleura more strongly punctate. Median area of propodeum more normal. Segments 5–7 of gaster with fewer piliferous punctures: segments 2 and 3 normal. Brazil: Santarem (*Bates*). It is almost certainly another species, but its naming and further description must wait until more material is available.

Plastibalia Kieff.

Plastibalia Dalla Torre, 1910, *Ent. Jahrb.* **20**: 178 (*nomen nudum*).
Plastibalia Kieffer, 1911, *Boll. Soc. ent. Ital.* **41**: 246, 249.
Plastibalia Rohwer & Fagan, 1917, *Proc. U.S. nat. Mus.* **53**: 373.
Plastibalia Weld, 1922, *Philipp. J. Sci.* **21** (3): 324.

Second segment of hind tarsus with a prolongation on outer side (fig. 9A). Mesoscutum regularly transversely ridged. Scutellum behind with two large incurved teeth (fig. 30).

Genotype *P. nigripennis* (Westw.) (= *violaceipennis* Kieff.).

Key to species.

Vertex strongly longitudinally ridged: cheeks not strongly bulging: wings very strongly infuscate, violescent: hind coxae not transversely ridged beneath . . . . . *nigripennis* (Westw.).

Vertex not strongly longitudinally ridged: cheeks strongly bulging: wings in greater part hyaline, with infuscate tip: hind coxae strongly transversely ridged beneath . . . . . *apicalis* (Westw.).

Plastibalia nigripennis (Westw.).

Liopteron nigripenne Westwood, 1874, *Thesaur. ent. Oxon.*: 132.
Liopteron nigripenne Dalla Torre & Kieffer, 1910, *Das Tierreich* **24**: 31.
Plastibalia violaceipennis Dalla Torre, 1910, *Ent. Jahrb.* **20**: 178 (*nomen nudum*).
Plastibalia violaceipennis Kieffer, 1911, *Boll. Soc. ent. Ital.* **41**: 249, **syn. n.**
Plastibalia violaceipennis Rohwer & Fagan, 1917, *Proc. U.S. nat. Mus.* **53**: 373.

Head length to interocular breadth = 1 : 1·4: emargination behind ocelli deep. Antennal grooves absent: vertex strongly longitudinally ridged: temples coarsely reticulate. Face medially slightly protuberant, without median keel: interantennal keel weak, but extending almost to median ocellus. Face with coarse and fine punctures, and with more or less transverse striae: cheeks sparsely punctate. Clypeus not delimited; with small basal pits; in greater part striate like the face, the striae directed toward the mouth; apically impressed. Malar space about 0·88 eye length. *Antennae* of ♂ (pl. 3, fig. 4*b*) slightly compressed, segment 12 as 3·7 : 1 : 1·2; segments 3, 4 and 5 as 1 (width 0·69) : 2·16 : 2·32: antennae of ♀ filiform; segments 3, 4 and 5 as 1 (width 0·61) : 1·74 : 1·62. *Pronotum* rather sparsely and irregularly punctate, strongly transversely ridged dorsolaterally; with very strong median tooth. *Mesoscutum* strongly transversely ridged, some ridges in anterior third much more outstanding, ridges wider apart behind: notaulices strong and percurrent, curving outward anteriorly and inward posteriorly; completely breaking through transverse ridges posteriorly but not anteriorly; ending anteriorly in elongate pits; median furrow strong and percurrent; antero-admedian furrows absent; parapsidal furrows indicated. Scutellum (fig. 30) dorsally coarsely reticulate, almost smooth behind; with weak lateral lobes; falling rather suddenly to level of metanotum. Mesopleura with medial longitudinal furrow uninterrupted; bulging and shining above furrow, sparsely and finely piliferous-punctate below; anteriorly and posteriorly below furrow with diagonal ridges: anterior upper area sparsely hairy. Mesosternum sharply

delimited from mesopleura in posterior half by a weak but distinct furrow, not delimited therefrom in anterior half; medially behind with two large teeth, which form the anterior margins of the coxal cavities. *Metapleura* very irregularly reticulate-punctate. *Propodeum* with longitudinal ridges and fine punctures; with lateral ridges produced into very strong lobes: median area not as long as its greatest breadth, its sides diverging to near apex; median longitudinal keel strong. *Petiole* of ♂ nearly equal to length of remainder of gaster, seven times as long as medially broad; of ♀ 0·65 times length of remainder of gaster, 6·5 times as long as medially broad; with a broad shallow median furrow and eight longitudinal keels; laterally very sparsely hairy. Gaster of ♂ not dorsally keeled; tergites 4, 5, 6 and 7 as 25 : 20 : 20 : 25; tergites 5–7 sparsely piliferous-punctate in part. Gaster of ♀ dorsally keeled from segment 3 hindward; tergites 4, 5, 6 and 7 as 32 : 35 : 18 : 15; tergite 5 sparsely piliferous-punctate in part; tergites 6 and 7 less sparsely so, with coarse and with rather fine piliferous punctures; tergite 7 slightly rounded dorsally; last sternite with strong hairs. Tergite 2 strongly impressed in both sexes. *Wings* (pl. 3, fig. 4) very strongly

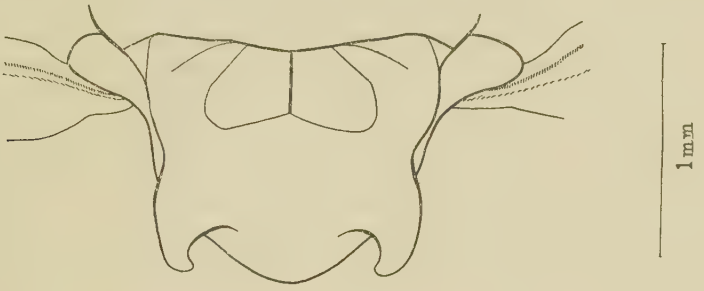

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Fig. 30.—Scutellum of *Pl. nigripennis* (Westw.) holotype ♂.

infuscate, strongly violescent. Radial cell about 4·2 times as long as broad: cubitalis not arising on upper third of basalis. *Hind tibia* with apical external tooth strong and prominent (fig. 9A).

Black; pubescence stramineous, that on tibiae and tarsi black.

Length 10–12 mm.

Brazil: Amazons.

Holotype ♂ in Mus. Oxford: two ♀ syntypes of *P. violaceipennis* Kieff. in British Museum (58.6).

Plastibalia apicalis (Westw.).

Liopteron apicale Westwood, 1874, *Thesaur. ent. Oxon.*: 133.
Liopteron apicale Dalla Torre & Kieffer, 1910, *Das Tierreich* **24**: 31.

Head length to interocular breadth = 1 : 1·32: emargination behind ocelli rather shallow. Antennal grooves distinct, anteriorly finely reticulate-punctate: vertex coarsely punctate and irregularly longitudinally striate: temples coarsely punctate: stemmaticum large and shining. Face medially slightly protuberant, without median keel: interantennal keel strong. Face with coarse and very fine punctures, and with moderate punctures above clypeus: cheeks strongly bulging; with coarse punctures, and with horizontal striae which are fine behind, coarse toward clypeus. Clypeus very indistinctly delimited; with small but deep basal pits; with a few coarse punctures; in greater part striate like the cheeks, the striae directed toward the mouth; apically weakly impressed and emarginate.

Malar space 0·89 eye length. *Antennae* (♂) (pl. 3, fig. 5*b*) slightly compressed, segment 12 as 2·8 : 1 : 1·1; segments 3, 4 and 5 as 1 (width 0·59) : 1·71 : 1·71. *Pronotum* rather sparsely and irregularly punctate, strongly transversely ridged dorso-laterally; with very strong median tooth. *Mesoscutum* strongly transversely ridged, some ridges in anterior half more outstanding: notaulices and median furrow strong and percurrent; antero-admedian furrows distinct; parapsidal furrows moderately strong. Scutellum with small but deep basal pits; dorsally and behind coarsely reticulate; without lateral lobes; falling rather suddenly to level of metanotum. Mesopleura with medial longitudinal furrow narrow, widening posteriorly, interrupted by two short keels anteriorly; below furrow finely piliferous-punctate anteriorly, below, and posteriorly; above furrow smooth and shining, bulging behind, with a few rather fine piliferous punctures just below anterior upper area; along anterior margin with four diagonal ridges, and a diagonal pit above and below these: anterior upper area sparsely hairy. Anterior margins of cavities of mid coxae produced internally into strong teeth. *Metapleura* irregularly punctate to reticulate. *Propodeum* with irregular longitudinal ridges and fine punctures; with lateral ridges produced into very strong, sharp lobes: median area deep, broader than long; median longitudinal keel rather weak. *Petiole* (♂) 0·94 times length of remainder of gaster, 5·8 times as long as medially broad; with median furrow strong but not nearly reaching the base; with six lateral longitudinal keels. Gaster (♂) with segment 2 impressed; with dorsal keel suggested on segments 2–4, not on 5–7; tergites 4, 5, 6 and 7 as 27 : 19 : 15 : 23; tergite 4 with a few fine piliferous punctures; tergites 5–6 coarsely and sparsely piliferous-punctate; tergite 7 more densely so, coarsely medially and more finely laterally and (morphologically) posteriorly. Last sternite ending in a prominent piliferous tooth. *Wings* (pl. 3, fig. 5) in greater part hyaline, basally infuscate: fore-wings with a well-defined apical infuscate area. Radial cell 3·6 times as long as broad: cubitalis arising on upper third of basalis. *Hind coxae* strongly transversely ridged beneath. Hind tibia with apical external tooth very strong and prominent.

Black; mandibles pale rufous except at apex; pubescence pale golden-brown, darker on tibiae and tarsi.

Length 9¼ mm.

Brazil: Amazons, 1861 (*Bates*).
Holotype ♂ in Mus. Oxford.

Pseudibalia Kieff.

Pseudibalia Dalla Torre, 1910, *Ent. Jahrb.* **20** : 178 (*nomen nudum*).
Pseudibalia Kieffer, 1911, *Boll. Soc. ent. Ital.* **41** : 246, 247.
Pseudibalia Rohwer & Fagan, 1917, *Proc. U.S. nat. Mus.* **53** : 374.
Pseudibalia Weld, 1922, *Philipp. J. Sci.* **21** : 324.
Pseudibalia Weld, 1930, *Proc. ent. Soc. Wash.* **32** : 138.

Hind metatarsus with a prolongation on outer side (fig. 9*b*). Mesoscutum coarsely reticulate.

A single described species.

Pseudibalia fasciatipennis Kieff.

Pseudibalia fasciatipennis Dalla Torre, 1910, *Ent. Jahrb.* **20** : 178 (*nomen nudum*).
Pseudibalia fasciatipennis Kieffer, 1911, *Boll. Soc. ent. Ital.* **41** : 247.
Pseudibalia fasciatipennis Rohwer & Fagan, 1917, *Proc. U.S. nat. Mus.* **53** : 374.
Pseudibalia fasciatipennis Weld, 1930, *Proc. ent. Soc. Wash.* **32** : 138.

Head coarsely reticulate: length to interocular breadth = about 1 : 1·35 : emargination behind ocelli deep. Antennal grooves well marked, in greater part smooth and shining. Face medially protuberant, with strong blunt median keel; coarsely reticulate,

and with fine, more or less transverse striae. Clypeus not delimited; basally and laterally coarsely reticulate like the face; with a continuation of the median keel of the face; with large basal pits; in middle third transversely striate; in apical third strongly transversely impressed, the impression punctate, apically smooth. Malar space 0·69 eye length. *Antennae* (♀) clavate and slightly compressed, segment 11 as 1·3 : 1 : 1·22; segments 3, 4 and 5 as 1 (width 0·38) : 1·24 : 1·1. *Pronotum* coarsely reticulate, with strong median tooth. *Mesoscutum* coarsely reticulate; medially with transverse ridges, some of which nearly reach sides of mesoscutum, those in anterior half much more outstanding: notaulices and median furrow strong and percurrent, the latter greatly narrowed in front and greatly broadened behind; antero-admedian furrows very small; parapsidal furrows indicated. Scutellum dorsally coarsely reticulate; laterally weakly lobate; posteriorly with a pair of small, blunt, upturned teeth; falling suddenly to level of metanotum. Mesopleura slightly bulging; with medial longitudinal furrow irregularly interrupted, reflected anteriorly and posteriorly; smooth and shining above furrow and below middle of it; longitudinally striate along anterior margin; anteriorly below with an elongate transversely-divided pit; elsewhere below furrow irregularly piliferous-punctate: anterior upper area rather sparsely hairy. *Metapleura* coarsely reticulate. *Propodeum* irregularly longitudinally ridged; lateral ridges strong but not lobate: median area broader than long; median longitudinal keel rather strong, bifurcate posteriorly. *Petiole* (♀) 0·34 times length of remainder of gaster, 2·67 times as long as medially broad; with a strong median furrow and eight longitudinal keels (the dorsal keels double in the type); laterally sparsely hairy. Gaster (♀) dorsally keeled from segment 3 hindwards, falling rather gradually behind; tergites 4, 5, 6 and 7 as 55 : 19 : 17 : 13 (type); tergite 2 distinctly impressed; tergite 4 bearing conspicuous pilosity; tergites 5–7 strongly piliferous-punctate, smooth behind and below; tergite 6 bituberculate; tergite 7 with a pair of strong ridges ending in tubercles, dorsally rounded beneath these; spiracle in upper surface of a pit; tergite 8 and ovipositor sheaths strongly projecting. *Wings* (pl. 3, fig. 6) luteous to hyaline; fore-wings with an infuscate fascia beginning at base of radial cell, and with margin of apex infumate; hind-wings with an incomplete infuscate fascia. Radial cell about four times as long as broad: cubitalis arising well on upper third of basalis. Hind tibia with strong apical external tooth (fig. 9*b*).

Black; mandibles, legs, and gaster rufous to black.

Length 7½–9½ mm.

Mexico: Villa Nova. Brazil: Amazons, Obidos.

Holotype ♀ in British Museum; ♀ specimen in Mus. Budapest.

In the Budapest museum is a female specimen belonging to another species. I have thought it useful to give its main differences from *P. fasciatipennis* Kieff. but, as the clypeus is embedded in gum and the wings are all broken off short, I have not described it:

Antennal grooves in greater part shining: pronotum with strong median tooth: scutellum apically weakly bidentate: gaster dorsally keeled from segment 3 hindwards, falling rather gradually behind: segment 4 with conspicuous pilosity . . . . . *fasciatipennis* Kieff.

Antennal grooves in greater part rugose, not shining: pronotum with margin medially raised but not into a tooth: scutellum apically strongly bidentate: gaster dorsally keeled from segment 5 hindwards, falling suddenly behind; segment 4 without pilosity . . . . . sp.

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Plate 1.

Liopteron immarginatum sp. n. male and female, × 4·5.

Plate 2.

Fig. 1. *L. abdominale* Westw. holotype ♀ showing *a.* right wings and fore leg, and *b.* part of head and left antenna, and whole of right antenna.
2. *L. compressum* Perty var. *minus* var. n. holotype ♀. Left fore-wing.
3. *L. levilaterale* sp. n. holotype ♀. Right wings.
4. *L. birói* sp. n. holotype ♀. Right wings.
5. *L. subpetiolatum* Westw. holotype ♀.
6. *L. laticeps* sp. n. holotype ♀. Right wings.
7. *L. fenestratum* Ashm. holotype ♂. Right wings, × 5·6.
8. *L. clavicorne* Westw. holotype ♀.
9. *L. rufum* Ashm. allotype ♂. Left wings, × 5·6.
10. *L. tarsale* Ashm. holotype ♀. Right wings, × 5·6.

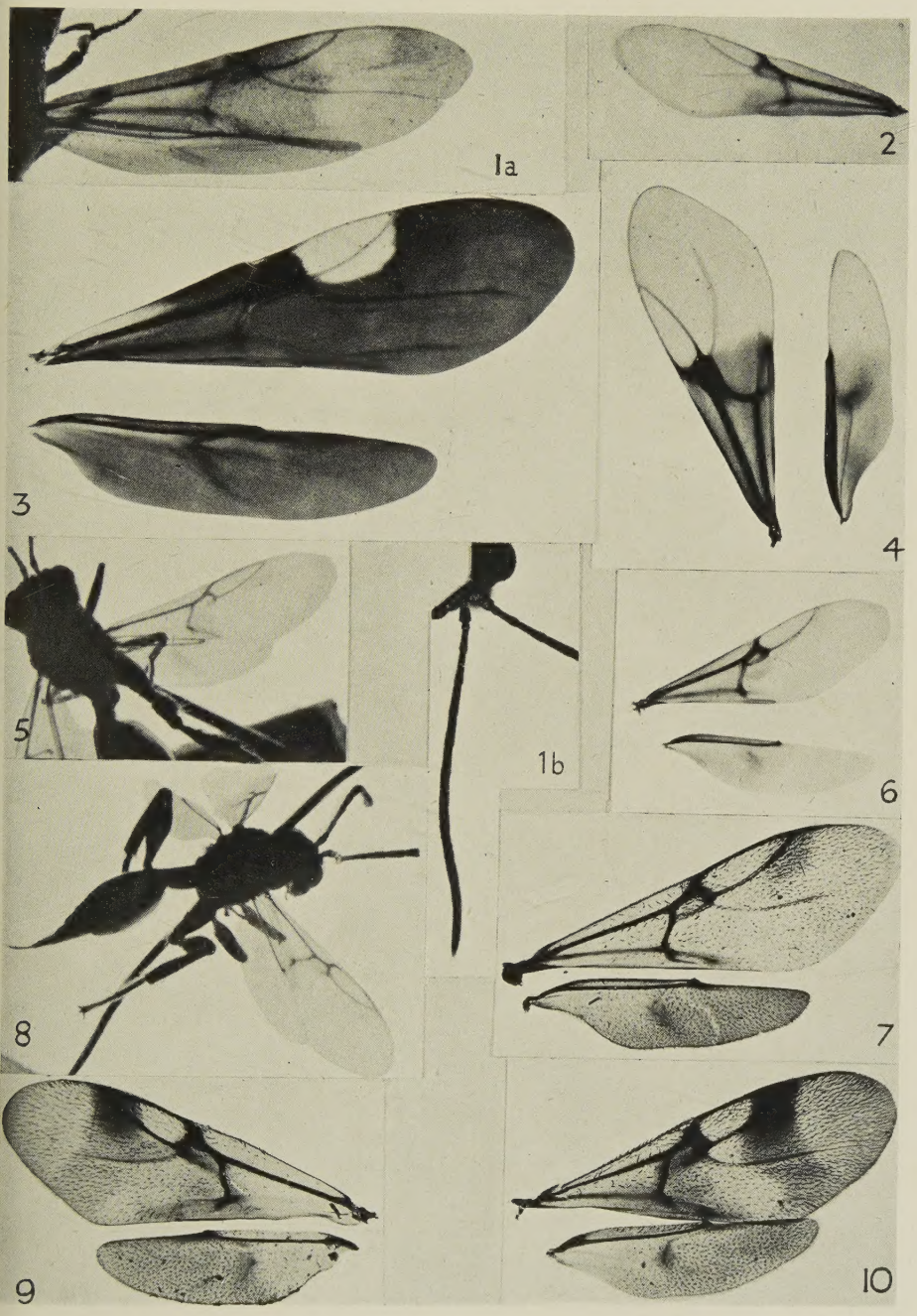
Figs. 7, 9 and 10 phot. L. H. Weld, remainder phot. F. S. J. Hollick (1935).

Plate 3.

Fig. 1. *L. fuscicorne* Westw. holotype ♀.
2. *L. bifasciatum* Westw. holotype ♂.
3. *L. unifasciatum* Westw. holotype ♂.
4. *Pl. nigripennis* (Westw.) holotype ♂, with (*b*) part of right antenna.
5. *Pl. apicalis* (Westw.) holotype ♂, with (*b*) part of right antenna.
6. *Ps. fasciatipennis* Kieff. ♀. Right wings.

Phot. F. S. J. Hollick (1935).

LIOPTERON IMMARGINATUM Sp. n.



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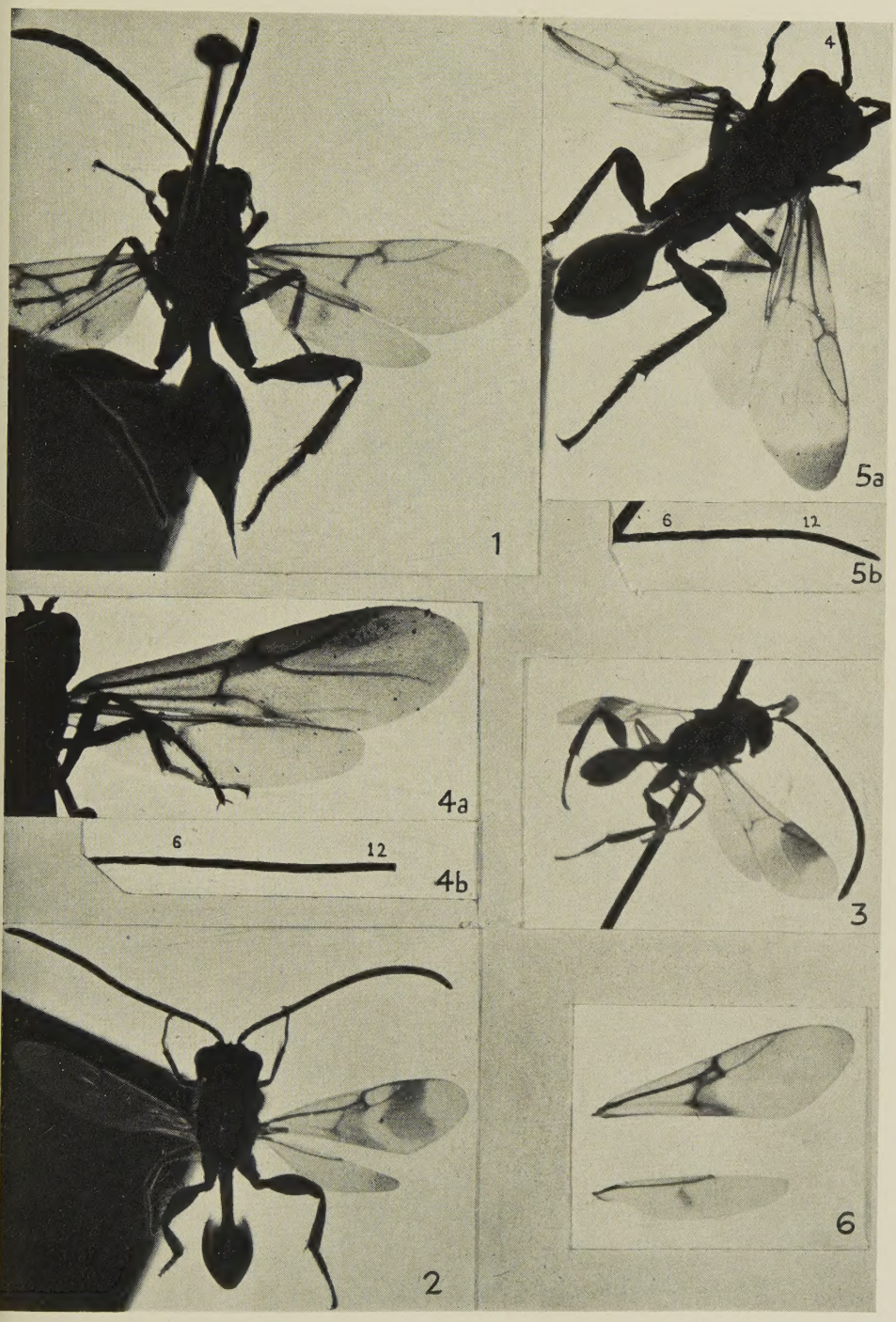

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H. Hedicke and G. J. Kerrich. Revision of **Liopteridæ.**